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## Fundamental Considerations in Rates and Rate Structures for Water and Sewage Works

A  
JOINT REPORT  
of  
COMMITTEES

of the  
AMERICAN SOCIETY OF CIVIL ENGINEERS  
and the

SECTION OF MUNICIPAL LAW OF THE  
AMERICAN BAR ASSOCIATION  
and of

Representatives of the

American Water Works Association

National Association of Railroad and Utilities Commissioners

Municipal Finance Officers Association

Federation of Sewage Works Associations

American Public Works Association

Investment Bankers Association of America



## Editorial Note

Two indispensable facilities of community living are water and sewage works. While anyone would, on second thought, at least, accept this dictum as the solid truth, widespread public alertness to our vital stake in adequate water and sewage works and services is a recent development. The country received a dramatic object lesson when, in 1949-50, New York City was confronted with a serious water shortage. That experience and such newsworthy activities as efforts to induce rainfall when and where we want it have made us sensitive to water resource and water supply problems.

The tremendous outward growth of our urban centers has helped to quicken awareness of both water and sewer needs and problems. Nearly half of our population increase during the decade of the 1940s is represented by people living in the suburbs of the 168 metropolitan areas in the country.<sup>1</sup> Citizens dwelling in the urban fringe want—they insist upon—urban-type public services. Certainly they are sensitive to immediate need; whether they perceive the metropolitan scope of water and sewage problems is another matter.

Urban growth and industrial development have aggravated our stream pollution difficulties. Public consciousness of this situation is not confined to the sports fisherman and the nature lovers. The geographical area concerned may be an entire region. Ohio is a party to an interstate compact under which eight states are cooperating to minimize pollution of the Ohio River.<sup>2</sup>

This progress is heartening, but there are other important parts of the larger subject which, unfortunately, have attracted but little attention. This, definitely, is the case with the problem of the fair distribution of the burden of providing the benefits of water and sewage works, a problem which directly affects most Americans. A householder receives his water bill periodically. In many communities in recent years a sewage charge has made its appearance on the water or a separate bill. How water and sewage rates and rate structures are made, however, and their relation to other means of footing the bill, such as ad valorem taxes and special assessments, has been shrouded in mystery.

The Journal is fortunate to be able to present what is, no doubt,

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<sup>1</sup> See 50 NAT. MUN. REV. 148 (1951).

<sup>2</sup> It is extremely gratifying that state constitutional objections to the compact, which had been embraced by the West Virginia Supreme Court of Appeals, have recently been rejected by The Supreme Court of the United States. *State of West Virginia ex rel. Dyer v. Sims*, 71 S. Ct. 557 (1951). See 11 OHIO ST. L. J. 552 (1950).

the first major study of the basic considerations involved in establishing fair water and sewage rates and rate structures, with both capital and operating costs taken into account. It is hoped that this study will prove helpful in promoting administrative, professional and lay understanding of an important, practical subject, which is almost universal in its impact.

The reader will observe that the report which follows, as did the composition of the group of men who prepared it, cuts across professional lines. This is as it should be. Engineering, financial and legal elements are considered together in their practical relationships in order to be realistic and to broaden understanding. From the standpoint of the lawyer the non-legal materials are indispensable to mature and thorough consideration of the legal aspects of the subject.

## Foreword

The Joint Group, with representation from the eight national organizations listed on the title page of this report, originated at the annual meeting of the Section of Municipal Law of the American Bar Association in Cleveland on September, 1947. At that meeting a paper entitled "Some Fundamental Consideration in Revenue Financing of Water Supply and Sewage Disposal Projects with Special Reference to Rate Structures" was presented by Mr. Samuel A. Greeley of Chicago, Illinois. Out of the discussion stimulated by that paper came a proposal that the Section engage in a joint study with the American Society of Civil Engineers pertaining to rates and rate structures of water and sewage works and related financing. This proposal was referred by the President of the American Bar Association to the Chairman of the Administration Committee of that Association for consideration. In a letter, dated December 10, 1947, to the Vice-Chairman of the Section of Municipal Law, the Chairman of the Administration Committee reported that it was the unanimous opinion of the members of that Committee that the proposed cooperation was entirely proper from the standpoint of the American Bar Association. Accordingly, a Committee of the Section of Municipal Law was appointed with Mr. Stephen B. Robinson of Los Angeles, California, as Chairman.

This action of the Section of Municipal Law was presented to the Board of Direction and the Division of Sanitary Engineering of the American Society of Civil Engineers by Mr. Greeley, then a Director of the Society, in January, 1948. He recommended that the Society, through its Sanitary Engineering Division, undertake a joint effort with the Section of Municipal Law of the American Bar Association and other appropriate associations for the purpose of a study and report on the fundamental aspects of rates and rate structures relating to water and sewage works financing. The Board approved this action. Accordingly, a committee was appointed by the Sanitary Engineering Division with Mr. Greeley as Chairman.

In accordance with the foregoing actions and discussions, it was considered proper by the two committees to invite or to accept representatives of other national organizations to join with the two committees in the undertaking. In this manner, six other national organizations became associated with the joint group of engineers and lawyers.

It was considered by the two originating organizations that there was a great need for re-examining the considerations affecting the determination of fair rates and rate structures in water and sewage works—rates and rate structures which may embrace gradual recovery or repayment of capital cost during the life of the property as well as provision for operation and maintenance.

It has been said, in fact, that "with rare exceptions, rates and rate structures are fundamentally unsound." This situation is well stated in the following quotation from a panel discussion published in the "Journal of the American Water Works Association" of November, 1949, under the title "Rethinking Water Rate Structures":

A 'review of the existing situation . . . suggests an amazing confusion about the basis for their determination and a wide diversity not only in existing rates, but in the schedules being currently proposed by leading water works engineers.'

It is recognized that existing rates and rate structures are often unsound because of the limitations imposed by positive law, whether a state constitution, statute or local charter. Such limitations affect both public works and those privately owned. In general, privately-owned works must now derive their total annual revenue solely from users; whereas, in public works, a variety of methods is included. Thus, the law governing public works may require that the total annual revenue be derived solely from users, or solely from properties by general taxation or special assessment, or, occasionally, from a combination of the two.

This report is issued as the principal fruit of nearly three years of committee activity.

The basic work of the group has been done by subcommittees. The full group has defined the objectives of the project, made other policy decisions and reviewed the work of the subcommittees. There have been six meetings of the full group as follows:

1948

October 15 and 16 in Chicago

1949

April 15 and 16 in Chicago

September 9 and 10 in St. Louis

1950

January 20 and 21 in New York

September 16 and 17 in Washington, D. C.

December 2 and 3 in Chicago

At the September 1949 meeting Mr. Stephen B. Robinson regretfully resigned as chairman of the lawyers' committee, in response to the demands of other responsibilities. He was succeeded by Mr. John D. McCall of Dallas, Texas.

It appears appropriate to identify, at this juncture, the active participants in the project.

## COMMITTEE ROSTER

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Mr. Arnold Frye  
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Mr. William F. Tempest  
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Mr. William F. Tempest Portland Cement Association Chicago, Illinois	Mr. Thomas M. Niles Greeley and Hansen Chicago, Illinois
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The chapter headings, listed in the table of contents, reflect subcommittee assignments during the later stages of the work. Actually, the very scope of the study underwent some changes as meetings were held and the work progressed. This was reflected by changes in subcommittee assignments. Undoubtedly, there would have been less lost motion had the committee been favored with a full-time research staff headed by an executive director. At the same time, the sustained interest the members of the group, all busy professional people, have displayed in seeing the project through to completion at considerable personal sacrifice, is a significant and gratifying example of interprofessional cooperation.

The reader is asked to bear in mind that this report speaks only for the Joint Group as a whole and does not necessarily represent the views of any individual member of the group. None of the listed organizations have taken any official action upon it and the conclusions and recommendations set forth do not commit any of those organizations in any way.





## CHAPTER 1

# Introduction

How should a utility, whether publicly or privately owned, compute and establish fair rates and fair rate structures for water and sewage works? This study supports the conclusion that the fundamental principle on which the answer to this question depends is as follows:

The needed total annual revenue of a water or sewage works shall be contributed by users and non-users (or by users and properties) for whose use, need and benefit the facilities of the works are provided approximately in proportion to the cost of providing the use and the benefits of the works.

The function of this introductory chapter is to outline the report and describe in a preliminary way the recommended procedures for the computation of fair rates. The basic inquiry and the development of the report have been affected right along by the more or less obvious idea that it is unfair to charge the needed total annual revenue entirely to users, on the one hand, or entirely to non-users, that is, property, on the other. The study led to the conclusion that both users and non-users should contribute to the needed total annual revenue approximately in proportion to the cost of providing for the use and for the benefits received. It is considered that rates and rate structures for water and sewage works should achieve fairness through payment by each user or beneficiary of his fair share of the total annual cost of the works required and no more.

In the early meetings of the Joint Group, topics were assigned for research, report, and discussion. The discussions gradually resulted in the organization of topical divisions which appear as chapters in this report. The scope and organization of the chapters grew to include the things which seemed both relevant and important. Thus, the procedure or technique of applying the fundamental principle comprises a determination and allocation to use and to property of the fair share of the construction cost and of the total annual cost of each major part or function of the works. Chapter 2, therefore, describes the major parts and functions of water and sewage works.

It is necessary to take into account differences between publicly and privately owned utilities as they enter into the history, status, and study of rates and rate structures. Thus, Chapter 3 is a comparison of public and private utilities as regards existing differences and their effect on rates.

Chapters 4 and 5 are concerned with existing methods of fi-

nancing publicly and privately-owned utilities. They deal with an essential phase of the project. Revenues from rates may be a major or the sole source of payment of securities issued to meet capital costs. Ad valorem taxes or special assessments may be in the debt service picture. Such factors are likely to condition efforts to arrive at fair rates and charges by applying fundamental principles and procedures.

The purpose of establishing fair rates and rate structures is to produce on a fair basis the total annual revenue needed by the works. It would appear, then, that determination of the total annual revenue requirements together with the needs of each part, involves factors to be considered in an understanding approach to the rate problem. Hence, Chapter 6 comprises a general discussion of the determination of annual revenue requirements.

Various rates and rate structures are described in Chapter 7 under the general title "Present Practices in Raising Total Annual Revenue for Water and Sewage Works." In this chapter several existing rate structures which provide for contributions from users and properties for use and benefit are described in some detail. Chapter 7, by revealing the vagaries of present methods of fixing rates, provides perhaps the best statement of the need for this study.

Chapter 8 represents some suggestions as to methods and procedures for computing rates and rate structures in accordance with the fundamental principle already stated. Detailed computations to illustrate hypothetical cases are included. The title of the chapter is "Recommended Procedures for Establishing Fair Rates and Rate Structures." The methods described must be characterized at this stage as somewhat preliminary and tentative. It seems likely that much testing of the recommended procedures will be required before standard methods will emerge.

Chapter 9 describes the present methods of enforcing the payments resulting from established rates and rate structures and makes recommendations for the future. It must be evident that the availability of fair but effective means of enforcement, to assure substantially complete collections, is highly important.

There are many differences in local conditions throughout the forty-eight states. There are differences in constitutions, enabling acts, charters, court decisions, powers of regulatory bodies, practices of long standing, and in the views of investors as regards the other types of differences noted. It is hoped that some of the existing legal limitations will be removed either by amendment or by interpretation and the way thus paved for the adoption and application of the fundamental principle of this report.

## Elements and Functions of Water and Sewage Works

A description of the major parts and functions of water works and sewage works is offered in this chapter to provide orientation. It is desirable that a working familiarity with water and sewage facilities be gained before giving specific attention to fair rates, rate structures and related financing. A careful reading of this descriptive material and study of the diagrammatic illustrations, which appear at the end of the chapter, should enable one to visualize clearly the major parts of water and sewage works and to grasp the interrelationship of their functions.

### 1. WATER WORKS

A public water works system exists for the purpose of acquiring, collecting, processing and delivering the water needed for the multitudinous uses of the consumers. The absolute necessity for a public water system in present-day communal development is well recognized. The water so provided must be of a quality suitable for the various uses to which it will be put.

#### a. *Elements*

A water works system may broadly be divided into three main subdivisions, namely, its (1) collecting, (2) processing and (3) distributing elements. Chart I shows pictorially the principal components of modern water works systems. Not all plants include all of the elements shown thereon. The facilities required in each plant depend upon local conditions and requirements.

Water is secured from one or more of four general sources, (1) collecting and impounding reservoirs, (2) lake, river and other intakes, (3) springs and wells and (4) infiltration galleries and tunnels. Sometimes the source furnishes water for processing or directly to the distribution system by gravity. More often, however, the supply must be pumped to the treatment works and again re-pumped to the distribution system for use. Supplies secured from impounding and collecting reservoirs quite often require full treatment but in certain locations with unpolluted upland sources the water may be used with little or no treatment.

The processing of the water, the second element, varies in degree from little or no treatment, other than chlorination, to the more complex methods of treatment which may include softening. Water from river and lake supplies generally requires quite complete treatment, including screening, sometimes aeration and pre-

settling, adding chemicals, mixing, coagulating and settling, filtration through sand beds and finally chlorination, before it can be used.

Water from springs, wells and infiltration galleries generally requires little processing and sometimes is served with no treatment whatever. In some cases, however, iron, maganese, carbon dioxide or other deleterious ingredients are present and must be eliminated or reduced. This is accomplished by aeration, followed sometimes by settling and filtration.

Present-day requirements are demanding more and more that the supply be softened if the hardness is high and that it be substantially free from tastes and odors. In other words, not only must the final product be of satisfactory sanitary quality and adequately meet the needs of industry, but it also should be esthetically acceptable. In the past few years even mass medication, consisting of the addition of fluorine for the reduction of tooth decay, has been carried into practice.

The third element of a water system consists of the facilities for the delivery of the water to the users after it has been collected and processed. Satisfactory service requires that the water be delivered in adequate quantities and at suitable pressures for all general purposes. This requires in most cases that the water be lifted by pumping to an elevation or pressure which will distribute it throughout the system with the flows and at the pressures required.

A water distribution system consists of feeder or transmission mains and a grid of lateral mains providing service to the streets of the community served. Cast iron pipe has in the past been largely used for the distribution system but in addition cement-asbestos and concrete pipe are now being used. Hydrants for supplying the water needed for fire-fighting, and sometimes flushing purposes, are distributed through the system as needed.

Most systems have some storage located in the distribution area to level off the peak demands which would otherwise fall on the supply, treatment, pumping and distribution facilities. Storage also serves to regulate more evenly the system pressures. It may be in the form of ground level earth embankment or concrete reservoirs, covered or open, or it may be provided in steel reservoirs, stand-pipes and elevated storage tanks.

In many systems isolated areas of the municipality may require because of elevation or distance from the supply point, that pressures be raised by repumping. These areas, distinguished from the main or normal service areas, are termed high pressure or high service areas. In some systems, there may be several of these high service areas imposed one upon another to render satisfactory service to the increasing higher elevations.

From the lateral mains in the street, the water is conveyed to the user through service pipes of copper, lead, iron or steel equipped with the necessary stop valves. In most works, the amount of water used by each user is measured by a meter and bills are based upon that measurement. In some cities, bills for water service are based upon the number of water fixtures installed, or upon a fixed rate determined from street frontage, height of building or similar factors having little or no relationship to the amount of water actually used.

#### *b. Functions*

The functions of a water works may be divided into (1) furnishing a product for consumption and (2) rendering other services.

Water, as a product, is essential to the maintenance of human, animal and vegetable life. It is an essential ingredient in many commercial and industrial processes.

Of little less importance to urban life are the other uses to which water is put. Water is necessary as a cleansing and flushing agent. A water-carrying system is the most satisfactory and economical method yet found for disposing of the organic wastes of a community. Without water modern sewage collection and disposal would be impossible. Industry and commerce not only make use of water as an essential part of their product, but many establishments, such as chemical works, breweries, bleaching and dyeing plants, refineries of various natures and the like, also use water of varying degrees of purity and chemical qualities in processing their products. Power generation, heating, cooling and refrigeration are many times dependent upon water as a basic necessity.

Adequate water works stimulate community growth and tend to stabilize property values. The water works system is the main dependence in modern cities for the water used for fire-fighting.

There is another method of classifying water in terms of its use, which may cut across that just described. This is by reference to whether the use is (1) domestic, (2) commercial, (3) industrial or (4) public. Sometimes purchase by other public corporations or other works is treated as a fifth division.

Since human consumption is a prime purpose for which public water supplies are provided, it is essential that the product supplied be as incapable of causing disease as possible. The water furnished should be relatively harmless to the physical facilities used in its transmission and containment and to the processes in which it is used after delivery.

#### *c. Relation of Elements and Functions to Financing and Rate Making*

In providing a product and rendering other services by water

works there is required the expenditure of relatively large amounts of money, as capital outlay, to provide the facilities and property required for the purpose. Once the facilities are established the costs of operating and properly maintaining them will, of course, constitute a continuing current expense. The dual purpose of furnishing a product of consumption and other services brings to attention the many conditions and requirements which must be met. These variations influence the investments required and they in turn affect the cost needed to provide for the use and benefits of the works. The total cost must be secured in some fair way from those who use the water and from the properties benefited thereby.

## 2. SEWAGE WORKS

A sewage works is a community facility which consists of a variety of structures and devices designed to collect, treat and dispose of domestic and industrial wastes carried off by the "spent" water of a community. It may also serve to collect and carry off storm water. In addition, there is a considerable infiltration of ground water into the sewers. The multiplicity of structures and functions indicates a variety of problems arising in the allocation of costs as required in proper financing and rate-making procedures.

Certain parts of a sewage collection system are made larger than required by direct use so as to provide for subsurface infiltration, and in combined systems, for surface drainage. The cost of this additional capacity is not caused by users but by or for property. In similar manner, sewers generally are designed with sufficient capacity for increased use in the future, since this is more economical than to duplicate the sewers later. This excess capacity is not required for existing loads of present users and, therefore, its cost should be allocated insofar as possible to those properties which will cause the growth of load. Such growth in load will be due largely to the development of property currently undeveloped but also in part to the increase in load of existing customers.

### a. *Elements*

The term "sewage works" includes facilities for collecting, pumping (where necessary), treating, and disposing of sewage. Chart II illustrates the essential parts of a sewage works, from the source in the home or industry to the point of final disposal in a stream or body of water. Sewage works commonly are divided into the sewer system, and, where one is provided, the sewage treatment works.

Sewer systems are of two general types; the separate system in which, as the name implies, sanitary and storm sewers are constructed as separate systems, and the combined system in which one

pipe or conduit conveys both sewage and storm water. The sewer system is further subdivided, in relation to the transit of the sewage "downsewer" into (1) the building drainage system, including those facilities within an individual property, (2) the building sewer, or the connection to the public sewer, (3) the lateral sewer, (4) the branch or submain sewer, and (5) the trunk or main sewer. Other types of sewers for particular purposes are (6) intercepting sewers with attendant storm overflows in the case of a combined system, (7) relief sewers and (8) outfall sewers. Where elevation of the sewage is necessary, pumping stations may be either of two types; booster or lift stations to elevate a portion of the sewage along the sewer system, and main pumping stations.

The sewage treatment works consists in general of two parts; (1) works for the removal or destruction of objectionable matter and organisms and (2) works for the disposal of solids. Under the former (removal works) there may be included; preliminary processes, such as coarse screening and grit removal; primary processes, such as sedimentation and fine screening; secondary processes, such as biological methods as in the trickling filter and activated sludge methods; and miscellaneous processes under which might be included the addition of chlorine and other chemicals. The works for the disposal of the solids can be subdivided into preliminary processes, such as digestion, elutriation, vacuum filtration and drying beds, and secondary processes, such as incineration, barging to sea, and fertilizer production.

#### b. *Functions*

A sewage works performs a number of direct and indirect functions which may be classified as follows:

##### (1) Sewer System

- (a) Collects and removes discharged wastes of community living, commerce and industry.
- (b) Provides surface drainage in case of combined systems and of storm sewers.
- (c) Provides subsurface drainage.

##### (2) Sewage Treatment Works

- (a) Removes, destroys, and disposes of objectionable materials and organisms so as to avoid nuisance and permit reasonable use of the receiving waters by the residents of the particular community and others.

##### (3) General

- (a) Safeguards private and public health and welfare.
- (b) Provides for the security and development of property, and for the growth of the community both within and outside corporate limits.



- (c) Renders a direct service in the removal and treatment of industrial wastes which vary in composition and in their effect on costs of the sewage works.
- (d) In some cases, renders a special service in the conveyance and disposal on a community or individual basis of certain solid wastes such as ground garbage.
- (e) Renders a special service in the conveyance and disposal of spent waters used in air conditioning.
- (f) Protects the community against claims for damages by riparian owners.

*c. Relation of Elements and Functions to Financing and Rate Making*

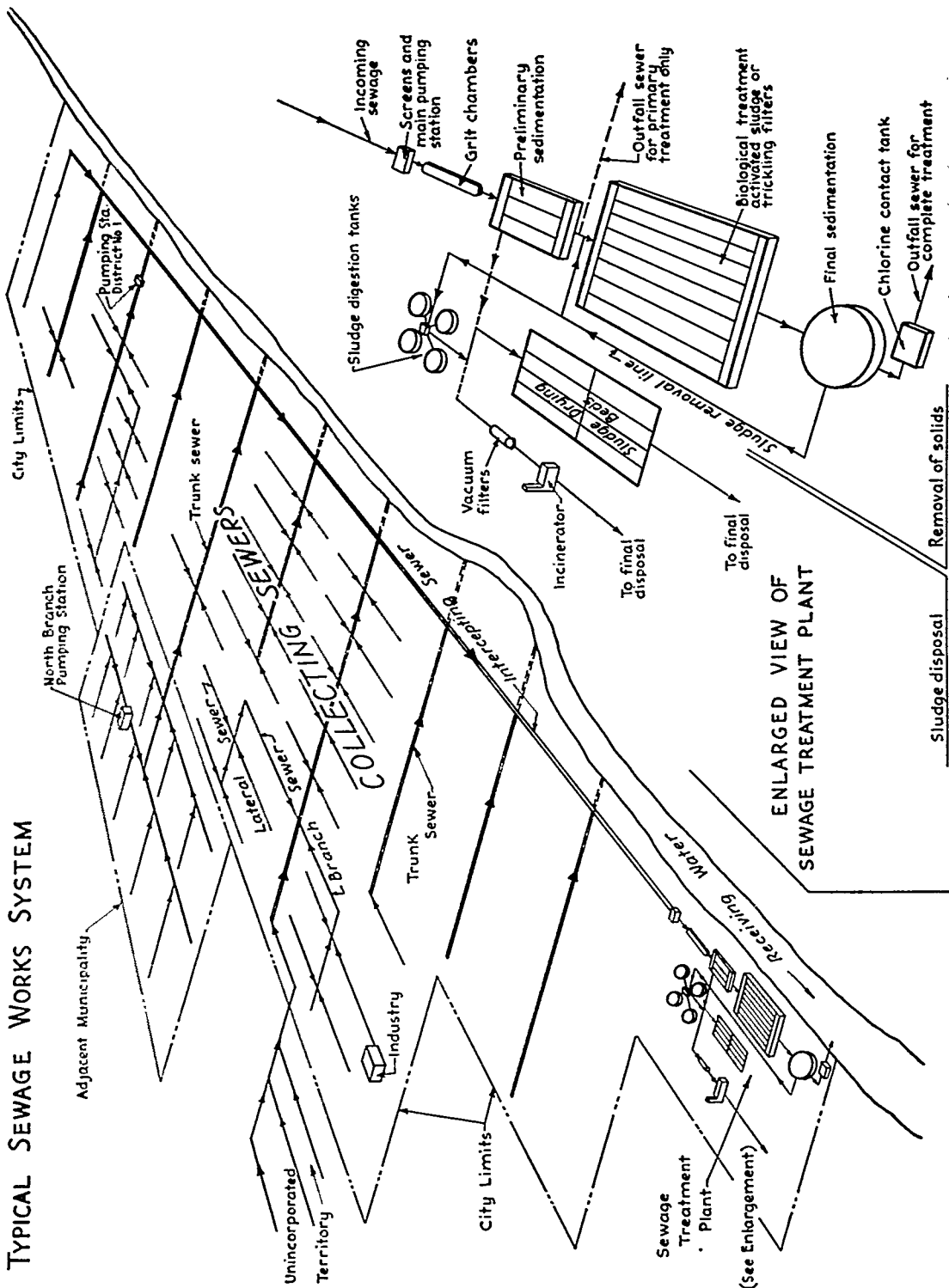
It is apparent, with respect to both users and property, that the measures of use and benefit vary in the several portions of a sewage works. Obviously, certain portions of the works operate to provide a benefit for which payment on an area or property basis is indicated. Others render a benefit to the users of the facilities for which payment on a basis which measures use (volume or volume and strength) appears proper. The various portions of a sewage works serve limited or greater areas or properties and this influences financing and rate-making procedures. Thus the building drainage system and the building sewer provide an individual or special service, whereas the sewage treatment works, the main pumping station and the outfall sewer serve the community or area as a whole. Intermediate facilities serve a more or less limited area.

Furthermore, the costs of construction and operation of the various parts of a sewage works are affected differently by the volume and strength of the liquid wastes. Thus, the service which particular users and properties (such as industries, for example) receive, should be evaluated in relation to those influences. Considering the sewage treatment works alone, it is apparent that certain portions, such as the sedimentation tanks, are influenced principally by volume; other portions, such as the oxidizing processes, are affected particularly by organic loadings; and in still others, such as the sludge disposal facilities, the solids content of the sewage is the factor of consequence.

(OPTION REQUIRED: CULDESTRATION ONLY)



# TYPICAL SEWAGE WORKS SYSTEM



## CHAPTER 3

# Publicly and Privately-Owned Utilities

While publicly-owned water works systems predominate there are many privately-owned systems. At the same time, there are relatively few privately-owned sewage works. It is considered that the fundamental principle stated in Chapter 1 on which water and sewage rates should be based is applicable to each kind of ownership. However, there are differences in the acts and traditions under which the two operate which modify the procedures recommended in Chapter 8 for computing fair rates and rate structures. These differences are discussed in this chapter since they affect the determination of rates and rate structures.

Generally speaking, privately-owned utilities cannot use a rate structure, one part of which provides for a charge to property. However, charges to a municipality by a privately-owned utility for public fire protection often result in a payment by property through taxes levied by the municipality. It might be desirable in some cases to extend this procedure to comprise a fair charge to property for the benefits to property. Amendments to existing acts and practices may be needed. Comparisons made in this chapter are in terms of utilities which are physically identical.

### 1. METHODS OF FINANCING

#### a. *Assessment of Adjacent Property*

A publicly-owned utility may, in some jurisdictions, assess a portion of the construction cost against adjacent property. A privately-owned utility has no such power or authority except to a limited extent in special instances where customer contributions may be required for long extensions. When such assessments are made for new construction they either result in a reduction in the expenditure of utility funds, or in a repayment of such expenditure. Assessments will likewise result in a lower rate base because of deduction of contributions and assessments, from the gross construction cost, in the determination of a rate base. Thus, assessments may, to a degree, take care of the matter of property benefits.

#### b. *Equity Capital*

The fact that privately-owned utilities are financed in part by equity capital, while publicly-owned utilities are financed principally by indebtedness, creates a difference in the attitude toward the return which must be earned by each on any given rate base.

The details of this difference will be discussed in Chapters 4 and 5.

c. *Federal Aid*

Another variation often occurs between privately and publicly-owned utilities in the form of federal grants and other aids, which have frequently been given to publicly-owned utilities but seldom, if ever, to privately-owned utilities.

## 2. SOURCES OF REVENUE

a. *A Charge Against Property*

One difference between privately-owned and publicly-owned utilities, insofar as the source of revenue is concerned, is that some publicly-owned utilities, especially sewer utilities, are authorized to include in their rates in perpetuity, an annual or periodic charge against property, whether or not the owner uses the service. An example of this type of rate is in effect in the Washington Suburban Sanitary District, where the rates include a periodic charge per front foot of land and also a periodic charge as a percentage of the assessed valuation of the property. It is presumed that these charges against property are based on the theory of benefits conferred and are equivalent to an assessment against property as part of the cost of construction of a publicly-owned system.

b. *Public Fire Protection*

The treatment of the cost of public fire protection service furnished by water utilities, often misnamed "hydrant rental,"<sup>1</sup> may also differ between publicly and privately-owned utilities. Because the cost of this service is more nearly proportional to the value of the property protected than to the demand for and use of water by utility customers, the charge for public fire protection service is normally charged to the municipality whose citizens receive the protection.

In the case of a privately-owned water utility, the charge for public fire protection service is made to the municipality which in turn includes that amount in its budget to be met largely by property taxes. Sometimes the same procedure is followed if the utility is publicly-owned, but in most instances the charge is reduced materially or even omitted entirely.<sup>2</sup> To make needed funds available

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<sup>1</sup> The term "hydrant rental" probably came into use because the charge for fire protection service often varies approximately in proportion to the number of hydrants in service. Actually the hydrants constitute only a small part of the property necessary to furnish fire protection service.

<sup>2</sup> Ayres, *Basic Considerations in Determining Water Rates*, 42 AM. WATER WORKS ASS'N. JOURN. 981, 986 (1950):

Based on the A.W.W.A. survey of operating data for 1945, it appears

in the latter cases, it may be necessary to increase utility revenues by higher rates on other types of service. As an alternative the cost burden of the service furnished by a publicly-owned utility may be included in the general property tax. In the latter case the burden is likely to be borne by the taxpayer in substantially the same proportion as would have been the case if the fire protection charge were paid by the municipality in the form of charges by the utility.

The treatment of fire protection costs and charges requires some modification when one utility sells water at wholesale to another utility for use both for general service and for fire protection. This practice is quite common with publicly-owned utilities. In such cases, that part of the cost of public fire protection represented by additional capacity in source of supply, pumping equipment and feeder mains, is included in the cost of water furnished at wholesale.

### 3. REVENUE REQUIREMENTS

#### a. *Operation and Maintenance Expenses*

Operation and maintenance costs for any particular physical property should be substantially identical under either public or private operation. Thus, the repair or replacement of a hydrant, the cost of labor and materials and the general office and administration expenses should not vary with the type of ownership.

#### b. *Depreciation*

Depreciation in comparable operating utilities should not differ merely because the utilities are publicly or privately operated and consequently no difference should exist in accounting for the annual depreciation expenses. Some publicly-owned utilities either omit this item entirely from their revenue requirements or cover it by an amortization requirement.

#### c. *Taxes*

Taxes usually represent the principal difference in the annual expenses of publicly and privately-owned utilities. The privately-owned utility is normally subject to ad valorem and income taxes, and, in some cases franchise taxes, while the publicly-owned utility is usually exempt from income taxes and franchise taxes<sup>3</sup> and may

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that only 193 out of a total of 462 cities, or 42 percent collect *any* revenue on account of fire protection. Of the 462 cities reported, 43 are privately owned and 419 publicly owned. Of those privately owned, 81.4 per cent collect a fire charge, but of the publicly owned, only 37.7 per cent.

<sup>3</sup> It may be noted that the Indiana gross income tax law has been applied to municipal utilities. *Department of Treasury v. City of Evansville*, 223 Ind. 435, 60 N.E. 2d 952 (1945).

be exempt from part or all of the usual ad valorem taxes or payments to the levying units in lieu thereof.

d. *Interest on Indebtedness*

Whether the utility be privately or publicly-owned, one of its revenue requirements will be the provision of funds to meet the interest on its bonded or other indebtedness. Publicly-owned utilities may be able to borrow at lower interest rates and the ability to assess property may in some cases reduce the total amount of indebtedness which the utility must meet, but, aside from this, there is no difference in this particular revenue requirement between publicly and privately-owned utilities.

e. *Funds Required to Retire or Amortize Existing Debt*

If annual amortization or payment of utility indebtedness approximates or is less than the annual provision for depreciation expenses, such annual debt payments can often be made from the depreciation fund. The portion of revenues representing net operating income can then be used to make all interest payments and also to provide a portion of the cost of additions and betterments. It is a common and acceptable practice to use depreciation funds to finance replacements, to amortize outstanding debts and to help meet the cost of additions and betterments to the system. In publicly-owned utilities the annual amortization requirements may often exceed annual depreciation charges, in which case the excess represents an additional revenue requirement. Privately-owned utilities ordinarily have no such problem, since generally they do not amortize their indebtedness to the same extent as publicly-owned utilities. Such amortization as they do must be effected with depreciation funds or from utility income otherwise available for dividends. In the case of either publicly or privately-owned utilities there is no danger in this use of depreciation funds.

f. *Additional Funds*

Whether the utility be privately or publicly-owned, the owners are necessarily concerned as to the amount of return in dollars needed for the continuance of successful operations. The privately-owned utility is entitled to earn a reasonable return on its net investment, or on any other rate base which legally may be established in accordance with applicable law, if it can obtain such earnings under reasonable and non-discriminatory rates. The private facility must endeavor to earn a return sufficient to meet the revenue requirements already noted and in addition to provide reasonable earnings upon its equity securities sufficient to maintain their value at levels calculated to attract the additional capital necessary for

extensions and improvement. This is, of course, a matter to be taken into consideration in determining the amount of a reasonable return on the rate base of a regulated utility. On the other hand, a publicly-owned utility and particularly one serving the customers of a single municipality only may be satisfied to earn something less than a full return without thereby jeopardizing its ability to borrow money at low interest rates. In case reasonable rates provide a publicly-owned utility with more funds than needed in the reasonably foreseeable future, excess net revenues are sometimes transferred to the general fund of the governmental unit which owns the utility. Such payments are usually considered to be a return on the investment, made by the taxpayers of the municipality, in the utility. In other cases, particularly when the investment in the utility consists principally of previous utility earnings, unnecessarily high earnings are often reduced by lowering utility rates so as to restrict earnings to the amounts required for successful operations.

#### 4. GOVERNMENTAL REGULATION

In most of the states certain of the activities of privately-owned water utilities are subject to regulation by a state regulatory commission acting under the provisions of state law. The activities so regulated usually include the quality of service, the amount and nature of debts, uniform accounting, authorization of construction, and the level and structure of rates. In one or more states, such as Wisconsin, publicly-owned water utilities also are regulated in substantially the same manner as privately-owned utilities with the exception of the regulation of securities issues. There are very few privately-owned sewage works and this study has disclosed none which is regulated by a state regulatory commission. In the great majority of states publicly-owned water utilities and sewage works are not subject to regulation by any external authority,<sup>4</sup> such as a state public utilities commission. In some states private utilities are subject to local regulation.<sup>5</sup>

Whether the utilities are regulated by a municipal government, a sanitary district commission, or a state regulatory commission, the reasonableness and legality of the actions of the cognizant authority are subject to court review. There is considerable variation in the authority granted to regulatory commissions in the different states and probably even greater variation in the powers granted to local

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<sup>4</sup> For a valuable recent analysis of the state legislation see Kneier, *State Supervision over Municipally Owned Utilities*, 49 COL. L. REV. 180 (1949). See also Kneier, *Competitive Operation of Municipally and Privately-Owned Utilities*, 47 MICH. L. REV. 639 (1940).

<sup>5</sup> See, for example, LA. CONST. of 1921, Art. VI, § 7.



governmental units with respect to utility regulation. These variations allow and may sometimes require variations in the handling of specific problems. In some cases federal agencies have certain jurisdiction such as where pollution of interstate waters is involved or when a project affects a navigable stream of the United States.

Although many of the aspects of the regulation of utility business will be discussed more fully in subsequent chapters, one subject which may properly be mentioned at this point is the advisability of maintaining accounts of utility business separately from other costs of business or government. This is quite universally done in privately-owned utilities but publicly-owned utilities are more prone to allow an intermingling of utility costs with the costs of other public business. For example, the cost of engineering, billing and collecting and other utility administrative work may be borne by the public or the governing body without appropriate charges to the utility and on the other hand the utility may furnish many services to the public or to the governing body without charge. Such services may include service to municipal buildings, drinking fountains and parks, and in some cases even hydrants and water for public fire protection. In many jurisdictions separate accounts and proper accounting are required by state law or municipal charter or ordinance but even where such requirements are not in effect by law they are dictated by sound business principles.

## CHAPTER 4

# Financing of Publicly-Owned Utilities

### 1. GENERAL CONSIDERATIONS

Any study of methods of financing, or allocation of required revenues of publicly-owned utilities, leads inevitably to the conclusion that exclusive use of any one method will result in distinct inequities. Two or even more methods may be desirable in distributing the costs in proportion to the benefits which accrue to the individuals within the total geographical area affected by the utility under consideration.

This chapter is concerned with the methods of financing publicly-owned water and sewage works and their relation to fair rates and rate structures. For very practical reasons, procedures for establishing fair rates and rate structures should, so far as possible, be applicable to existing methods of financing under existing enabling acts or should point the way to statutory changes or innovations. Many existing methods and combinations of methods of financing result in unfair allocations of the required total annual revenue as between persons and properties or users and nonusers. A clear presentation of existing methods of financing is needed to enable one to relate the fundamental principle stated in Chapter 1 to financing and to determine what changes, if any, in existing methods of financing are needed to give that principle practical effect.

Existing methods are many and complex. A competent study of the fair allocation of the required total annual revenue must include a description and review of these methods.

This chapter is not an attempt to cover means of financing all publicly-owned utilities. It is limited to consideration of methods whereby a community, which desires to construct or otherwise acquire or to improve water or sewage works to be owned by it, may raise the capital sums necessary for the purpose by borrowing on formal instruments such as bonds or notes.<sup>1</sup>

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<sup>1</sup> Limited amounts of incidental sewer construction, usually short extensions, are financed by budgetary appropriations for maintenance for which funds are made available from existing sources of revenue such as ad valorem levies or revenues from the utility or from the revenues of other utilities where permitted by law.

Glendale, California; Cushing, Oklahoma; and other cities have, likewise, found other utilities such as electric and gas, valuable revenue producers. An unusual example of what can be done is in the City of Orlando, Florida, where a ten per cent utility tax on all telephone, gas, electric and water bills has been exacted to pay for sewage treatment improvements, including a complete sewage treatment plant.

Some definitions should be ventured. For this chapter, a general obligation bond is one for the payment of which the issuer binds its full faith and credit and is payable from ad valorem general property taxes. A variant will be the general obligation tax-limit bond, similar in all respects except that the annual tax for the bond payments is subject to some legal limit, usually quantitative. The term does not include the bonds issued by an authority not having taxing power even though they are ordinarily the general and unlimited obligations of the authority. A special assessment bond is one payable only from the receipts of special benefit assessments (of any type) when collected and not from general taxes; the issuer is obligated only to try to collect the assessments and to apply them as promised. By synthesis, a general obligation assessment bond constitutes a special assessment bond with the added obligation on the issuer to levy general taxes for its payment if the special assessments do not come in. A revenue bond is one payable only from the income (not taxes or special assessments) derived from operation of a water or sewage system as a utility; the obligor is required only to operate the system with sufficient net income to pay debt service and to apply the net income as promised. And by one final extension, a general obligation revenue bond is a revenue bond to pay which, if utility income is insufficient or not available, a general property tax will be levied.

The oldest and most common method of financing capital expenditures, by general obligation bonds, is a method which is not unfair for financing the type of expenditure embracing municipal utilities, especially where this procedure has been the practice throughout the years. In a majority of instances, however, one or both of the following elements are present, which may introduce unfairness.

a. Operation and treatment costs are also covered by taxation, which results in nonusers paying unjust charges in excess of benefits which they receive. To the extent that nonusers benefit by fire protection afforded by a water system, or by storm or land drainage afforded by a sewer system resort to tax funds can be justified. Payment of all operation and disposal costs for sewage and industrial wastes from tax funds is, however no more justifiable than payment for all water from the same tax funds.

b. The service areas are enlarged and the new territory receives benefits of the system to the construction of which it did not contribute.

Combination financing, as, for example, special assessment bonds for new lines combined with the use of general obligation or revenue bonds for central works, is spreading rapidly. The avail-

ability of three different bases for the distribution of financing costs presents an opportunity for the adjustment of charges to individuals and properties more fairly in proportion to use and benefits, whether they be actual or latent.

A combination frequently used is that of general obligation bonds and special assessment bonds. General obligation bonds are often used for construction of new works, and special assessment bonds for laterals and extensions. Sometimes these two are combined with revenue bonds.

An American Waterworks Association Committee on Joint Administration and Collection of Water and Sewer Accounts reported in 1941:

Installation of a sewer system and disposal plant is beneficial to all properties, even to vacant property, by enhancement of potential values, and, therefore, properties should be taxed for the cost of these improvements. The costs of maintenance and operation are attributable to and equitably chargeable to the users of the works.<sup>2</sup>

The elements of cost of water and sewage utility functions fall naturally into certain principal accounts. Logically, this division will be followed in the best methods of accounting, calculating costs and fairly distributing charges. For water works, costs may be divided as follows:

- a. Construction or replacement of major structures which serve the area as a whole, such as dams, reservoirs, main pumping stations, purification plants, transmission mains and main distributing reservoirs;
- b. Construction or replacement of lateral water mains comprising the distribution system, including booster pumping stations and local distributing reservoirs, standpipes or tanks; and
- c. Operation and maintenance of the entire system, including pumping and treatment.

A similar division for sewage works may be made as follows:

- a. Construction or replacement of major structures which serve the area as a whole, such as trunk and intercepting sewers, main pumping stations, sewage treatment plants and outfall sewers;
- b. Construction or replacement of lateral sewers which comprise the collecting system, including local pumping stations; and
- c. Operation and maintenance of the entire system, including pumping and treatment.

These divisions are used as a general basis for discussion in this

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<sup>2</sup> 33 AM. WATER WORKS ASS'N. JOURN. 1911, 1915 (1941).

chapter, although they are necessarily somewhat arbitrary and are subject to variations required by different circumstances.

In either case, the first division is one from which benefits are derived by every user and nonuser, though the capital outlay required to provide for the service a person or property owner may require will vary. The items in the second division are of benefit chiefly to local service areas. Those in the third benefit both users and nonusers, but benefits vary between them with the principal benefits accruing to the users. Benefits vary also among users, depending upon demand and total use, or, in sewage works, the volume and strength of industrial wastes to be handled. With such a division of costs, a three-part combination financing might be expected to provide a logical and flexible plan.

The commodities and services sold or furnished by water works and sewage works have already been described in Chapter 2. It is clear that: a.) Each property, occupied or not occupied, receives benefits, either actual or latent, from the existence of water and sewage works in the community. b.) Each property is further benefited by the existence of water mains and sewers in the streets adjacent to the property. c.) Each person, whether a user or non-user, is benefited by the existence of water and sewage works in the community, through improved public health, fire protection or drainage, and through civic improvement, industrial prosperity and property development. d.) Each person who is a user is benefited to a greater degree than the nonuser.

The basis for a three-part method for municipal financing may be briefly restated. The use of general tax funds to finance at least part of the construction or replacement of major structures is justified, since each property, occupied or unoccupied, and each person, whether user or nonuser, receives benefits. Property is further benefited by the existence of water and sewers in adjacent streets. The use of special assessments to finance acquisition, construction or replacement of local structures is justified by the benefit to abutting property from the existence of water and sewer lines in the streets. The use of sewer rentals or water charges to finance operation and maintenance charges is fully warranted by the greater benefit to users. Some nonusers escape any charge for benefits such as fire protection or drainage, unless ad valorem taxes or special assessments are used to finance major construction or replacement costs.

Addition of some minimum sewage charge on every water consumer's bill, whether having a sewer connection or not, as is the practice in Brainerd, Minnesota, or forced connection to sewers, as authorized in Florida and other states, would eliminate the escape of some who generally do escape where general ad valorem taxes are not used.

Perhaps the finest existing example of three-part allocation of costs is provided by the Washington Suburban Sanitary District. Gross revenues for both water and sewage works are produced by: a.) an ad valorem levy of six cents per hundred dollars of assessed valuation, b.) a foot-front benefit assessment on all property abutting water mains and, likewise, on those properties to which sewer service is available, and c.) water use charges based on metered water use. The amount collected as the public's share under the six-cent tax is somewhat less than 10 per cent of the total revenue. The property share under the foot-front assessment and the user's share under water use charges are each approximately forty-five per cent of total revenue.

It should be borne in mind, of course, that, at the present time, legal authority for employing the three-part method for the allocation of costs is wanting in many jurisdictions.

## 2. GENERAL OBLIGATION BONDS

Ad valorem taxes still constitute one of the most common methods of paying for municipal improvements. When capital funds are needed, bonds are issued on the basis that all property in the municipality will be taxed ad valorem for their payment; the improvement is considered to be of general benefit to all property and the tax paid by the property owner is his proportionate share of the cost of the improvement without regard to any service or utility feature. In recent times, this broad outline of the usual financing program has become subject to modifications and additions as mentioned later under this heading.

In most states, the issuance of general obligation bonds by local units of government is subject to limitations, sometimes constitutional, sometimes statutory, and usually expressed quantitatively by reference to assessed values of taxable property. Frequently there will be a stated percentage limit, with exceptions or deductions provided in case of such items as bonds voted by the people or bonds approved by some state agency or bonds issued for self-supporting projects or special assessments or taxes levied and remaining uncollected. Quite commonly bonds issued for water purposes are both exempt from the limit and deductible in applying the limit to other financing.<sup>3</sup> More and more commonly, applicable statutes are providing that general obligation bonds shall mature in serial annual installments ending within the estimated useful life of the improvement to be financed thereby.<sup>4</sup>

Where restrictions and requirements of this sort do not interfere, general obligation bonds may well and fairly be used to finance

<sup>3</sup> See, for example, OHIO GEN. CODE § 2293-14.

<sup>4</sup> The North Carolina Municipal Finance Act is illustrative. GEN. STAT. OF N.C. § 160-382 (1943).

at least a part of the construction or replacement of major structures, since it is assumed that all property and persons benefit thereby. Unless some special arrangement is made, the debt service burden will rest upon all property and persons in the community, whether users or nonusers. Frequently general funds from any available source are used for amortization and interest charges, but more commonly resort is had to ad valorem taxation, limited or unlimited, to produce funds for payment.

Viewed strictly as a means of raising funds, general obligation bonds have substantial advantages. Because of their security features and generally because of the habits of the municipal bond market, they usually will command a lower interest rate than the other types of bonds under discussion. By reason of the security features and of their general standardization for market purposes, general obligation bonds lend themselves readily to public sale on sealed competitive bids, and assure the highest price and lowest interest cost available in the market. For the same reasons, it is generally true that the overhead costs of financing—engineering, legal and financial—are less for an issue of general obligation bonds than for a comparable issue of revenue bonds; bidders on a more or less standardized article of merchandise such as a general obligation bond do not require the detailed engineering surveys and reports, complex legal covenants and provisions or searching financial analyses necessary in connection with revenue bonds. Security and payment of revenue obligations must depend on the practicability and economics of the construction or operation of a utility plant, on the special legal covenants made with respect thereto and on the application of future revenues therefrom.

General obligation bonds, additionally secured by a pledge of water or sewer revenues pursuant to authority conferred by positive law, are likely to carry still lower interest rates. The use of net revenues from the utility to lower the annual tax levy, otherwise necessary for the general obligations, or even to make such a levy unnecessary, as provided in the North Carolina statutes<sup>5</sup> and those of other jurisdictions,<sup>6</sup> increases the attractiveness of general obligation bonds.

### 3. SPECIAL ASSESSMENT BONDS

Special assessment bonds are payable only from the receipts of special benefit assessments (of any type) when collected, not from general taxes.<sup>7</sup> Assessments imposed for such improvements do not

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<sup>5</sup> GEN. STAT. OF N.C. § 160-397 (1943).

<sup>6</sup> VA. CONST. § 127 (b).

<sup>7</sup> It is well to note that there have been instances in which the holders of special assessment bonds established general liability of municipalities based

include any charges for service, nor payment in proportion to such service or the availability of service. Generally they are intended to apportion among property owners the initial cost of a local improvement about in proportion to the direct or indirect benefits accruing from the improvement. They become a lien on the property, usually inferior to the lien of ad valorem taxes. Such bonds are generally payable serially, as assessment payments become due.

In some states there are varying provisions making special assessment bonds wholly or in part general obligations. Thus, in North Dakota, upon maturity of the last warrant, any unpaid principal or interest becomes an unlimited general obligation of the municipality.<sup>8</sup> In Washington, every city issuing special assessment bonds is required to create a limited guaranty fund for the payment of special assessment bonds out of ad valorem tax levies.<sup>9</sup>

Assessments may be made according to a legislative rule by reference to such factors as foot-frontage or areas, or imposed on the basis of a specific administrative or judicial determination of benefits.<sup>10</sup> In general, with either municipal or private utilities, there are items in connection with the improvement which cannot fairly be charged to the property owner and which are charged off to either new works or to operation and maintenance, whichever seems more expedient.

The Montana Public Utility Commission requires that the cost of installing all pipelines, aside from distribution mains, must be paid by the owners of abutting property.<sup>11</sup> Wisconsin statutes permit the assessment of cost of water mains to the extent of special benefits; the amount assessed is limited to one-half the cost of furnishing and laying a main of not more than six inches diameter.<sup>12</sup>

It is interesting and important to note that in a very few jurisdictions, properties specially benefited may be assessed even though they are outside the geographical limits of the assessing governmental unit.<sup>13</sup>

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upon the failure to impose valid and enforceable assessments. See *Bessemer Investment Co. v. City of Chester*, 113 F. 2d 571 (3d Cir. 1940) and *Fordham, Revenue Bond Sanctions*, 42 COL. L. REV. 395, 408 *et seq.* (1942). For express statutory provisions on this subject see N.D. REV. CODE OF 1943 § 40-2505 *et seq.*

<sup>8</sup> N.D. REV. CODE OF 1943 § 40-2608.

<sup>9</sup> WASH. REV. STAT. § 9351-1 *et seq.* (Remington, 1933).

<sup>10</sup> *Roberts v. Richland Irrigation District*, 289 U.S. 71 (1933).

If an assessment is imposed on the basis of a specific administrative or judicial determination of benefits, due process of law requires notice and an opportunity to be heard. *Browning v. Hooper*, 269 U.S. 396 (1926).

<sup>11</sup> Cited in Gross and others, *Diversion of Water Department Reserve Funds*, 41 AM. WATER WORKS ASS'N. JOURN. 982, 993 (1949).

<sup>12</sup> WIS. STATS. § 62.19(2) (1949).

<sup>13</sup> *Indianapolis v. Bryan*, 188 Ind. 586, 125 N.E. 38 (1919); *McMurray v. Kansas City*, 283 Mo. 479, 223 S.W. 615 (1920); *Petition of City of Pittsburgh*, 110 Pa. Super. 310, 168 Atl. 496 (1933).



Special assessment bonds are issued only where certain properties are recipients of special benefits not accruing to other properties. Since only those specially benefited are required to pay, this is a fair method of allocating costs.

The degree of special benefit may vary. Thus, in the State of Washington, the cost of paving an ordinary street is assessed against the land abutting upon that street. But, the cost of paving an arterial street, where the special benefits may be said to accrue to a larger area, may be assessed against property in the greater area, with a definite proportion allocated to abutting property and the remainder of the cost distributed on a lower assessment basis amongst the lots and tracts in a surrounding area.<sup>14</sup> The same method may apply to the installation of a trunk water or sewer line.

Special assessments may be levied by most municipalities and by municipal districts, commissions, and other types of local bodies, as may be authorized by statute.

Costs to a municipality on assessment bonds will vary widely, depending on many features, such as a.) maturities, b.) redemption provisions, c.) the mode of enforcing collection of assessments, d.) whether the lien can be wiped out by the sale of property for failure to pay general taxes, e.) provisions for broad assessment bases, f.) high interest rates and penalty provisions for unpaid assessments to provide for cushions or reserves, as well as serve as sanctions, and g.) a record of unfavorable court decisions in a state. The general experience of the investment market with special assessment bonds in a state or in an area will have a decisive effect on marketability and interest rates. Total costs are always relatively higher on assessment bond issues and any local unit with sufficient general obligation or other borrowing capacity may consider covering construction costs subject to assessment by these less costly forms of borrowing.

#### 4. REVENUE BONDS

It has often been difficult or impossible for municipalities to finance needed facilities or improvements under the enabling acts relating to general obligation bonds and special assessment bonds. Constitutional or statutory tax and debt limitations, feasibility limitations on assessment bond uses, requirements of electoral approval and other factors often stand in the way. Revenue bonds provide at least a partial answer.<sup>15</sup> As a matter of fact, they do much more; they have come of age as a sound financing mechanism.

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<sup>14</sup> WASH. REV. STAT. § 9366 (Remington, 1933).

<sup>15</sup> See Foley, *Revenue Financing of Public Enterprises*, 35 MICH. L. REV. 1 (1936); *Some Recent Developments in the Law Relating to Municipal Financing of Public Works*, 4 FORD. L. REV. 13 (1935); and Williams and Nehemkic, *Municipal Improvements as Affected by Constitutional Debt Limitations*, 37 COL. L. REV. 177 (1937).

While special function local units have often been created where revenue bond financing was contemplated, it does not follow, of necessity, that such financing will result in undesirable proliferation of overlapping units of government. It must be obvious that power to issue revenue bonds may be granted to established general function units, such as cities.

Attention is called to the fact that the power to issue revenue bonds depends upon delegation by positive law.<sup>16</sup>

There is no painless magic in financing improvements by the issuance of revenue bonds; the inhabitants of the community must pay for the improvements by the rates and charges. In a sound revenue bond financing operation it must be made certain that the community has the capacity to meet annual costs. The distribution of annual costs over various income groups is, however, different under revenue financing than under general obligation bond financing.

Improvements thus financed should meet all the tests of economic necessity and be capable of becoming self-sustaining and self-liquidating. The utility must, therefore, be operated on a business basis, which must be demonstrable through operating statements.

Although the first municipal revenue obligations were offered by Spokane, Washington, in the early eighteen nineties, in the form of certificates payable solely from the income of its water works, and court decisions established that they were not general obligations of the city,<sup>17</sup> little use was made of this form of financing before 1920.<sup>18</sup>

The current revenue bond era began in the early 1930's. Federal subsidies and loans in aid of public works projects, which were, in turn, expected to relieve unemployment, served as a major stimulus to revenue bond financing in a depression period not congenial for general obligation borrowing. At that time extrinsic factors, notably debt and tax limitations, as well as reduced assessments and poor tax collections, influenced resort to special obligations to finance facilities which were self-liquidating in character.

A survey in 1938 indicated that more than 600 municipalities in 35 states were using revenue bonds on sewage disposal projects.<sup>19</sup> In the state of Texas, alone, there were approximately 200 revenue

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<sup>16</sup> The Colorado case of *Shields v. City of Loveland*, 74 Colo. 27, 218 Pac. 913 (1923), is exceptional. There, revenue bonds were upheld in the case of a home rule city without benefit of enabling legislation.

<sup>17</sup> *Winston v. City Spokane*, 12 Wash. 524, 41 Pac. 888 (1895).

<sup>18</sup> For a chronological summary see the pamphlet issued by Strahanan, Harris & Oatis in 1928 entitled, *On the Nature and Origin of Revenue Bonds of Political Subdivisions*, at p. 17.

<sup>19</sup> Greeley, *Organizing and Financing Sewage Treatment Projects*, 68 PROCEEDINGS OF AM. SOC. OF CIV. ENGRS. 1727, 1736 (1942).

bond financed sewage disposal systems.<sup>20</sup> At the present time, this type of financing is even more widely employed for water and sewer projects as well as many other classes of improvements considered self-liquidating in character. Many authorities and commissions are limited to the revenue bond method of raising capital.<sup>21</sup> The device has gained status on its merits as a sound and attractive method of financing in appropriate cases.

There is generally no legal limitation on the amounts of revenue bonds which may be issued;<sup>22</sup> the limit is not legal—it is economic. Excessive offerings would not be likely to attract bids from responsible bankers. Diluted issues would, at best, bear interest rates quite adverse to the borrowing unit. The bond market and estimated revenue may generally be expected to provide adequate restraints upon those charged with the duty of financing and managing.

There are many things which affect the saleability of revenue bonds. In a number of states, statutory mortgages or liens on physical property may or must be given.<sup>23</sup> Whether this type of security is desirable is highly debatable. Bond buyers are, in general, much more interested here than would be the case on other types of bonds in such things as the economic justification for the project as a business venture; management of the property; public relations attitude of officials; methods of billing and collecting; rate structures, including provision for rate increases as needed to meet debt service requirements; freedom from competition; policy of the borrowers as to financial management, with particular reference to use of separate funds for administering service charges or revenues ~~pledged~~ insurance;<sup>24</sup> adequacy of reserve funds provided for in proceedings; various approving or ~~other~~ ~~proceedings~~; and remedial sanctions appropriate to this type of security. ~~revenue bonds are not approved by the normal rate~~ the municipality, higher interest rates may result, but where there is a satisfactory experience record under good management, it has been shown that the interest costs are comparable with those on general obligation bonds, at least in the case of water works issues.

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Leading example is the Port of New York Authority.  
The Florida special enabling acts contain limitations on amount. *E.g.* LAWS OF 1947, C. 24608. They are exceptional.  
U.S. CONST. ART. XVIII, § 12 (mandatory); TEX. REV. CIV. STAT., ART. 1001 (Vernon 1942).  
You will recall the collapse in 1940 of the revenue-bond financed toll bridge across Tacoma Narrows. A "covenant to keep the bridge insured saved" the bondholders. See Fordham, *Revenue Bond Sanctions*, 42 COL. L. REV. 105 (1942).

The State of Washington permits sewer districts and water districts to issue revenue bonds which are payable both out of the revenues of the systems and out of special assessments based upon special benefits levied against the real property in one or more portions or all of the sewer district or water district.<sup>25</sup> The areas assessed are incorporated in special districts called utility local improvement districts. This has permitted the construction of systems where bonds supported by revenues alone or special assessments alone could not be sold to finance the total cost. This method of financing has proved so successful that it has been proposed that other types of local governmental units be empowered to issue similar bonds.

a. *Applicability of Revenue Bond Financing*

Public agencies are finding in revenue bond financing many advantages which do not inhere in other types of financing. Revenue bond financing grounded in carefully-drawn enabling legislation and bond proceedings can have greater flexibility and be better adapted to the needs of a utility system than any other type of financing. It can readily surmount the difficulties created by the nonconformity of local jurisdictional lines to service areas. A city may organize to supply facilities to larger areas than any single unit could support. Cooperative development of utilities by local units frequently avoids the financial bottleneck which otherwise exists.

Generally speaking, revenue bonds may be supported by a pledge of revenues received from operations in any legitimate area of operation, whether within or without the geographical limits of the borrowing unit.

b. *Effect of Constitutional Debt Limitations on Revenue Bonds*

It is the dominant theory that the purpose of constitutional limitations on indebtedness, which may be incurred by a municipality or other local unit, is to keep resort to local tax levies in bounds.<sup>26</sup> Revenue bonds are payable from special non-tax funds. Thus, the prevailing view is that they are not debts in the debt limitation sense, and that is true without regard to whether the revenues pledged are confined to those of the particular properties being financed.<sup>27</sup> This is the "broad special fund theory."

The courts of a few states, however, have placed a sharp limitation upon the application of this doctrine; they have held that any particular issue of revenue bonds does not escape constitutional limitations unless the bonds are to be paid solely from the revenue

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<sup>25</sup> WASH. REV. STATS. § 11587 *et seq.* (Remington, Supp. 1940); Thorgrimson, *Municipal Revenue Bonds* (Mim. 1948).

<sup>26</sup> *Bank for Savings v. Grace*, 102 N.Y. 313, 318, 7 N.E. 162, 163 (1886).

<sup>27</sup> For collections of cases see *Struble v. Nelson*, 217 Minn. 610, 15 N.W. 2d 101, 103 (1944) and Note, 146 A.L.R. 328, 344 (1943), citing earlier annotations.

of the particular improvement which is to be constructed out of the proceeds of that issue, and not from the revenue of an entire system to which the improvement will be an addition.<sup>28</sup> This is the "limited" or "restricted special fund theory."

The rationale of the limited theory is not very convincing. The fundamental basis for concluding that revenue bonds are not "debt", under either theory, is that no tax burden is imposed. The limited theory tells us, in effect, that it is the equivalent of an increase in the tax burden to take away from taxpayers the advantage derived from having enterprise net revenues feed the general fund. Certainly, they could not object if such revenues were merely plowed back into plant from year to year.

In the case of the revenue bond financing of an outright purchase of an existing utility, or of the establishment of a complete new utility, there would be no debt limitation difficulty under either theory.

The limited theory does prevent use of revenues of an existing system to construct improvements which are extensions into new areas.

In an extension area where, for example, a standpipe or local sewage pumping station were required, charges to users only would be prohibitive unless the area were well occupied, or some other means of financing the major structures were devised. Charges to all property would be more fair because the project would promote the community development. The limited theory should not be deemed to stand in the way because charges so imposed would produce revenues of the improvement, not of existing property. Charges to users in such a case should also be required to include sufficient allotments to cover a share of operation, maintenance and treatment costs.

The use of revenue bonds under the limited special fund theory for the construction of extensions is so restricted by requirements for the proration of revenues and requirements for the use of revenues derived only from the particular improvement as to make revenue bond financing of extensions in those jurisdictions less desirable by limiting the security for any such bonds, even if it be assumed that in a particular case it is practicable to segregate revenues. Under the broad special fund theory, the potential use of revenue bonds is quite unlimited in scope, but, of course, restrictions may be imposed by statute.

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<sup>28</sup> *Ibid.* The leading restricted special fund case is *City of Joliet v. Alexander*, 194 Ill. 457, 62 N.E. 861 (1902). It is of great interest that the Illinois courts have since so far modified the rule of the Joliet case as to embrace, in effect, the broad theory. *Poole v. City of Kankakee*, 406 Ill. 521, 94 N.E. 2d 416 (1950).

c. *Financing with Current Revenues*

In many cities badly needed repairs and improvements have not been made because the appropriation for that purpose was from the general municipal budget and the appropriation for sewer work was curtailed in order to reduce the municipal operating budget to a minimum. The sewer repair and improvement budget appears to many city officials to be a portion of a municipal budget which might be reduced. When this view prevails badly needed repairs may be postponed.

In many cases a solution to the practice of postponing repairs and improvements has been the creation of a revenue fund for the sewer department from a sewage charge. The charges for sewage service have been based on a schedule which permitted the accumulation of a sum of money each year sufficient to provide for repairs and improvements after first meeting all charges for operation, maintenance and debt service.

In some municipalities, fear has been expressed that the adoption of a schedule of sewer rental or service charges, particularly charges based on water consumption, would have the effect of reducing the gross receipts from an existing water supply system. Actually, in practice, this condition has not come to pass.

In some states, the statutes do not permit inclusion of a capital item such as sewage construction in a municipal operating budget.

d. *Joint Water and Sewage Financing*

The statutes of many states permit joint water and sewer revenue bonds to be issued.<sup>29</sup> Some of these acts require that an existing water system be formally combined with the sewage system (either existing or to be constructed), and require the subsequent pooling of gross revenues, operation and maintenance costs, and debt service.<sup>30</sup>

Likewise, some states permit water revenues to be pledged to a sewer revenue bond issue, or sewer revenues to be pledged to secure a water revenue issue.<sup>31</sup> This pledging of revenues from one system to support the bonds of another is known as "cross-pledging". It is used to enable municipalities with established good earning water works to finance sewer projects through revenue bonds, particularly in those situations where sewer revenue bonds are not highly regarded by investors.

There are joint sanitary districts, such as the Washington Suburban Sanitary District, where all water and sewage works

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<sup>29</sup> This is true under OHIO CONST. ART. XVIII, § 12, where water and sewage works are operated as a single utility. See also W. VA. CODE § 591(14a) *et seq.* (Michie 1949).

<sup>30</sup> The West Virginia act cited in Note 29 is an example.

<sup>31</sup> See, for example, *Hess v. City of Orlando*, 133 Fla. 831, 188 So. 473 (1938).

financing is from joint revenue on a three-part basis: (1) an ad valorem tax; (2) a foot-front special assessment; and (3) a jointly-billed service charge for water and sewage.<sup>32</sup>

In the history of American municipal finance there is probably no continuing revenue that has such a satisfactory record of punctual payment in full as the water bill. The water bill is usually for a small amount of money covering a period of service of one month, one quarter, or, less frequently, a six-months or one-year period. Experience confirms that most water bills are promptly paid so that gross billings and gross collections are nearly the same amounts.

This well-recognized fact has developed a confidence in the security markets for bonds of water systems and bonds of communities issued for water purposes, especially those supported by a lien on the water revenues. This confidence as to payment of bonds is in evidence in revenue bond issues where there is no promise to pay from ad valorem taxes.

It is only natural that the water bill would be employed as a means of collecting other charges. In some situations this procedure may result in a much closer scrutiny of "water bonds". A specific illustration is afforded by Tampa, Florida, where the water system had been enlarged and extended from funds received from the sale of water revenue bonds payable solely from the net revenues of the water system of the city. In 1949 the same city embarked on a comprehensive sewer system and disposal works revenue bond project the cost of which was roughly three times the amount of the water revenue bonds then outstanding. The source of funds to meet capital costs was a charge of up to 135 per cent of the water bill. An ordinance authorizing the placing of the sewage charge on the water bill provided that the water bill could not be paid without payment of the sewage charge and the penalty for non-payment was to shut off the water supply. Under this method the charges were equal without priority or preference for water; for all practical purposes the security of the water bond and the sewer bond were identical.

One of the rating services rated the sewer bonds as a less desirable investment than the water bonds. This was probably a protest against the use of the water bill to carry the sewage charges; it carried some suggestion that there may be a different appraisal on water bonds payable solely from water revenues, if the water bill is or might later be used as a medium for collecting sewage charges that have the same dignity or lien as the water bill.

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<sup>32</sup> MD. LAWS OF 1918, c. 122, as amended and supplemented. See the section of Chapter VII relating to the district. It is to be noted that the security is fortified by an underlying commitment to pay from unlimited ad valorem taxes, if necessary.

The combination of water and sewage works into a joint system is sometimes utilized for the purpose of financing extensions to a system or the building of a completely new system through a refinancing and improvement revenue bond issue. In Arkansas an outstanding sewer or water works revenue bond issue may be redeemed through the use of part of the proceeds of a water and sewer refunding and improvement revenue bond issue.<sup>33</sup> Waterworks extensions may be built with part of the proceeds of the new bonds, and an entirely new sewage system may be constructed with the balance of the proceeds of such a bond issue. In Texas water revenue bonds, involving a combination of refunding and new financing, are being issued without the aid of express enabling legislation.<sup>34</sup>

Refinancing and improvement revenue bonds for joint systems also are issued for two or more of the following purposes: (1) to finance the cost of providing new sources of water supply, (2) to provide for the enlargement of a water system, or the installation of a sewage treatment plant, (3) to pay for repairs or replacements to an existing joint system, (4) to lengthen maturities of the revenue debt, (5) to prevent defaults or to cure defaults in principal or interest on outstanding debt, and (6) to take advantage of lower interest costs in a favorable bond market.

Any city having the legal authority should consider the installation of a combined administrative system and rate schedule for service, to be billed and collected through one office.

##### 5. DIVERSION OF FUNDS

Many enabling acts prohibit the diversion of water or sewage income to other activities.<sup>35</sup> These laws may have been framed to combat a lack of appreciation on the part of local authorities of the importance of competent and adequate management, maintenance and replacement of structures, and the necessity of providing sufficient funds for these purposes. If diversion were carried to the point of reducing operating, maintenance, depreciation, or debt service funds below the necessary minimums, then the principal justification for a revenue-producing system would be destroyed.

The Pennsylvania law authorizing sewage charges requires that any surplus above a ten per centum margin of safety be placed in the sewage sinking fund and forbids any transfer of funds to the general municipal funds.<sup>36</sup> Pennsylvania municipal water works are not, however, subject to such restrictions. It is reported that in the year 1944, fifty-seven per cent of such bodies made transfers

<sup>33</sup> *City of Harrison v. Braswell*, 209 Ark. 1094, 194 S.W. 2d 12 (1946).

<sup>34</sup> See *City of McAllen v. Daniel*, 147 Tex. 62, 211 S.W. 2d 944 (1948).

<sup>35</sup> See, for example, W. VA. CODE § 591(14i) (Michie 1949).

<sup>36</sup> PA. STAT. ANN. TIT. 53, § 1031 (Purdon Cum. Ann. Pocket Part, 1950).



which averaged thirteen per cent of their total water works revenues. Free water furnished to community buildings and activities also amounted to over four per cent, which, added to the thirteen per cent, makes contributions of seventeen per cent. The actual transfers equaled from eight per cent to as high as 114 per centum of the total tax revenues of the municipalities.<sup>37</sup> The laws referred to in the preceding paragraph are designed to eliminate such practices.

Purchasers of revenue bonds of publicly-owned utilities normally insist that the administration of utility revenues be governed by carefully spelled-out provisions designed to assure proper application of funds to the expenses of operation and maintenance and to debt service, including appropriate reserves, prior to transfer for any other purpose. It is difficult to generalize about the pertinent provisions of enabling statutes. It is safe to say that the tendency has been to require, or, at the minimum, to authorize, the establishment of separate funds for utility revenues and to provide ample authority for the making of covenants calculated to safeguard those funds.<sup>38</sup> Where the subject is not regulated closely by enabling statute, the bondholders are likely to desire that the bond proceedings cover the ground as fully as can be done under the general grants of power made by the enabling legislation. It may be urged with force that authority for covenants against undesirable applications of project revenues may be implied from the general provisions of an enabling act authorizing the issuance of revenue bonds.

Unless the statutes prevent such a covenant, the municipality can agree to apply all surplus revenues not required for operation and maintenance, bond service, and the other funds provided for in the bond proceedings, to the redemption of its revenue bonds through call or purchase prior to their maturity as rapidly as surplus funds are available for that purpose.

The Montana Public Utilities Commission in 1948 ruled that use of water revenues for other than water utility purposes constituted a violation of the regulations of the commission and of the principles of business operation.<sup>39</sup> The Commission prohibition is sometimes circumvented by borrowing the funds with repayment indefinitely postponed.<sup>40</sup>

Section 18 of Article 3 of the Constitution of New York forbids the Legislature to prohibit municipalities from using "profits" from

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<sup>37</sup> Ferguson and LeeDecker, *Municipally Owned Waterworks in Pennsylvania* 121 (Pa. Mun. Pub. Serv., State College, Pa., 1948).

<sup>38</sup> The West Virginia statute, cited in Note 35, *supra*, is mandatory. See also N.Y. Public Authorities Law § 1412 (Buffalo Sewer Authority).

<sup>39</sup> *In re City of Cut Bank*, 77 Pub. Util. Rep. (N.S.) 380.

<sup>40</sup> Gross and others, *Diversion of Water Department Reserve Funds*, 41 AM. WATER WORKS ASS'N. JOURN. 982, 993 (1949).

their public utilities for "municipal purposes" or "for refunds to consumers." The maximum profits permitted are: a tax equivalent, equal to what would be paid if privately owned, plus "a fair return on the value of the property used and useful in such public utility service."

The use of utility revenues for nonutility purposes is practiced rather widely. Municipal governing bodies have been known to divert water works surpluses as they pleased without consulting the management of the utility. Funds so used have constituted in some instances as high as 50 per cent of total water works revenues. Such practices are, of course, likely to produce operating deficits. A flagrant example of unauthorized diversion of water works revenues by an Illinois city is reported in the case of *Getz v. City of Harvey*.<sup>41</sup>

There are two problems here. The first involves the protection of consumers, holders of revenue bonds and the very utility function itself from the damaging consequences of the use of utility funds in violation of statute or in breach of trust or contract. The second relates to the determination of the policy question as to the extent to which the use of utility revenues for nonutility purposes should be permitted. From the standpoint of the holder of revenue bonds, the moral as to the first problem is that the "flow of funds" should be clearly spelled out in the bond proceedings; that there should be strong supporting covenants designed to close diversion loopholes; that the borrower should be committed to keep proper records and accounts, to furnish periodic financial statements and to permit inspection; and that there should be bondholder representation, as by a trustee or a fiscal agent, calculated to provide some scrutiny of fund administration.

It is granted that direct misuses of utility revenues are less difficult to control than such more or less hidden uses as free water for public or institutional use. This indirect diversion is doubtless least objectionable where the utility property is not subject to taxation; in that situation free service is a rough offset to tax exemption.<sup>42</sup> Correct application of the fundamental principle embraced by this report would require that water so consumed be paid for on the basis of fair rate schedules covering all uses.

There is not unanimity of opinion within the Joint Group with respect to what nonutility uses of water revenues might well be

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<sup>41</sup> 118 F. 2d 817 (7th Cir. 1941).

<sup>42</sup> In Ohio it has been determined that a statute forbidding a municipality to charge for water furnished for public school purposes was invalid as an invasion of a constitutional grant of authority to municipalities to own and operate public utilities. Board of Education of City School District of Columbus v. City of Columbus, 118 Ohio St. 295, 160 N.E. 902 (1928).

authorized. There is support for the policy embraced in the New York Constitution of 1938, which has been previously noted herein and which sanctions profits from municipal utilities aggregating an amount equal to the taxes which would be paid on the properties were they privately owned plus a fair return on the value of the property used and useful in the utility service. That policy provides a basis for permitting the use of part or all of the net profits for nonutility purposes. There is some support also for the view that so long as revenue bonds are outstanding profits should be confined to an amount not exceeding the first item under the New York formula, namely, an amount equal to the taxes which would be paid on the properties were they privately owned.

## 6. RATES AND CHARGES

Methods of fixing water and sewage charges are fully treated in Chapters 7 and 8 of this report. It will suffice for purposes of this chapter to relate such charges to the financing of capital costs in terms of the authority conferred and limitations established by governing legislation. The employment of water charges is so well-established and widespread that no special discussion is needed at this juncture.

Some state laws specify the purposes for which sewage charge revenues may be expended. New York<sup>43</sup> and Ohio<sup>44</sup> provide that revenues must be used first to operate, manage, and maintain sewers and treatment plants, and any surplus may be used for enlarging existing structures or for debt service. The statutes of both states specifically forbid the use of sewage charges for extending sewers into previously "unsewered areas". In Ohio, however, there is constitutional home rule authority to finance extensions to utilities by the issuance of mortgage revenue bonds and it is clear that existing facilities and revenues may be pledged to secure payment of such bonds.<sup>45</sup>

In Wisconsin, such funds may be used to pay capital costs, including debt service, as well as operation, maintenance and depreciation.<sup>46</sup> In Iowa, sewer revenue may be used to finance operation, maintenance, or construction of a sewage works, exclusive of "lateral sewers serving purely local territory."<sup>47</sup>

In Pennsylvania, the annual sewage service charges are required by the Sewer Rental Act<sup>48</sup> to be sufficient to cover the fol-

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<sup>43</sup> GEN. CITY LAW § 20(26) (McKinney 1951).

<sup>44</sup> OHIO GEN. CODE § 3891-5.

<sup>45</sup> Vollmer v. Village of Amherst, 65 Ohio App. 26, 29 N.E. 2d 379 (1940).

<sup>46</sup> WISC. STAT. § 66.076 (1949).

<sup>47</sup> IOWA CODE ANN. §§ 393.8, 393.9 (West 1949).

<sup>48</sup> PA. STAT. ANN. § 1031 (Purdon, Cum. Ann. Pocket Part., 1950).

lowing costs and no more:

- (a) Annual operation, maintenance, repair, alteration, inspection, depreciation, or other expenses in relation to such sewage system or sewage treatment works.
- (b) Amortization of the debt (including revenue bonds) incurred in the construction or acquisition of the sewage system or sewage treatment works and payment of interest on debt.
- (c) A ten per cent reserve. Any excess must be placed in the sinking fund.

Where sewage charges are used to yield the total revenue required for operation and debt service, some of the advantages claimed are: a.) funds can be adequately and continuously provided for efficient operation and the best service; b.) each user will pay a share of costs and nonusers will not be required to pay for service not received; and c.) the sewage system can be made self-liquidating.

The first of these is an excellent point in favor of sewage charge use and the third point makes it very attractive. The allocation of costs entirely to users does not, however, place a share of costs on the many nonusers who benefit, many very substantially, others to lesser degrees.

The use of sewage charges to obtain the revenue which should be contributed by users is highly to be commended. It is believed, however, as pointed out previously, that nonusers and property should contribute toward the revenues of both water and sewage works, in proportion to the many benefits which they receive. The point is fully developed in Chapter 8 of this report.

It must be clear from the foregoing discussion that local units in many states do not, under existing legislation, have the freedom of action needed to enable them to give effective application to the fundamental principle embraced by this report. A thoroughgoing reexamination of existing legislation is needed. If demonstrably better principles and procedures for allocation of costs can be developed, there assuredly should be a legal framework for their utilization.

## 7. AUTHORITY FINANCING

Beginning with the Port of New York Authority in 1921, we have come in recent years to use the label "authority" with reference to various special function public agencies at federal, state and local levels of government. Actually, the concept of a special public authority goes back several centuries in the history of English public law.<sup>49</sup> The distinguishing feature of an "authority" for pres-

<sup>49</sup> SIDNEY AND BEATRICE WEBB, *STATUTORY AUTHORITIES FOR SPECIAL PURPOSES* 17 *et seq.* (1922).

ent purposes is that, at the local level, it is organized to construct or otherwise acquire and to operate public facilities of a revenue-producing character which can be financed by the issuance of obligations payable solely from such revenues without recourse to taxation. Improvement districts, on the other hand, traditionally have depended upon ad valorem taxes or special assessments, or both. An authority may or may not have definite geographical limits. An authority can be used to provide a service throughout an actual service area which may overlap a number of existing local jurisdictions.

The Pennsylvania legislation is exceptional in empowering authorities which construct sewage works to make assessments for sewer construction.<sup>50</sup> The fact that authorities generally have no power of taxation does not, however, necessarily compel them to look only to users. Unless the pertinent legislation is restrictive in this respect, it would appear that an authority, like a municipality, could exact sewage charges from the owners of property not connected to the sewage system on the basis of benefits to the property.<sup>51</sup>

It is generally true that interest rates required of an authority will be higher than those for a municipality with good credit rating, due to the authority's lack of taxing power and because there is often no statutory limit on the debt of an authority. Another factor is the relatively short period that most authorities have been in existence, and consequently their lack of an extended record of earnings. It has been estimated that the differential between authority bond and general obligation bond interest rates may run as much as one per centum. Such a differential may materially affect the determination of the total annual revenue required for financing.

#### 8. SEWER AND WATER DISTRICT FINANCING; FUNCTIONAL CONSOLIDATION

Geographical or other special considerations may make desirable joint participation by adjoining municipalities or suburban areas. This may be achieved through the establishment of special districts for water or sewage purposes, or both, covering an appropriate service area, or by functional consolidation.

Many such districts have power to levy ad valorem taxes and issue general obligation bonds. In some states, they may issue

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<sup>50</sup> PA. STAT. ANN. § 2800zb-5 (r) and (s) (Purdon, Cum. Ann. Pocket Part, 1950).

<sup>51</sup> Colley v. Englewood, 80 Ohio App. 540 (1947). In this case authority for the charges was derived from a broad constitutional grant of power to municipalities to own and operate utilities.

revenue bonds and assessment bonds. In contrast with financing such as paving assessments, which are fixed at one time and imposed on the property benefited, it is quite common for improvement districts to issue bonds grounded on ad valorem taxation. The possibility that burden upon property owners may exceed benefits has not, in this type of financing, paved the way for successful attack under the due process clause of the Fourteenth Amendment.<sup>52</sup>

Functional consolidation involves the joint performance of a function by two or more local units. Thus, enabling legislation may authorize joint construction or purchase and joint administration of a water system. Usually, however, the financing under such a plan is technically separate; each unit issues its own general obligation bonds for its share of the cost. Revenue-bond financing of a joint project not separately incorporated, would involve obvious practical complications, although it is theoretically unobjectionable.

The conservancy districts in Ohio constitute an outstanding example of unfettered organization, with power to apply fair and effective business practices. Concerning the pertinent enabling legislation it has been said:

It makes feasible the establishment of a board, well removed from political influence, which can administer the extension of water lines into areas unable to finance them out of immediate revenues; it permits the sale of bonds outside the 10-mill limitation without a referendum. It allows bond retirement by levy, assessment, water revenues or a combination of these methods, thus placing the burden of improvement costs directly upon those benefited.<sup>53</sup>

The powers of the board of directors are extremely broad and include the dominant right over other public works and utilities, as well as over all lands within the district.

The operation and maintenance of the works is financed by the sales of water to persons and public corporations within the district. Rates are fixed by the board within the district. Rates are fixed by the board from time to time at intervals of not less than one year.<sup>54</sup>

While these powers do not include authority to issue revenue bonds they do embrace most of the powers possessed by any municipality plus those of a private utility. There is a corresponding responsibility to apply the most reasonable and fair financing methods and rate structures which can be devised.

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<sup>52</sup> *Roberts v. Richland Irrigation District*, 289 U.S. 71 (1933).

<sup>53</sup> Fawcett, *Enabling and Restrictive Legislation in Ohio*, 40 AM. WATER WORKS ASS'N. JOURN. 284, 292 (1949). See also Wilkin, *A Study in Administrative Law: The Conservancy Act of Ohio*, 3 OHIO ST. L.J. 33 (1936).

<sup>54</sup> *Ibid.*, at 290.

## 9. COMBINATIONS OF FINANCING

It will be remembered that there are three major elements of cost in a water or sewage facility. These may be placed in three cost categories: a.) construction or replacement of major structures, b.) construction or replacement of local structures, and c.) operation and maintenance.

The existing methods of financing described in this chapter may be arranged for illustrative purposes into various combinations or plans, each keyed to the stated cost categories. These plans of financing are equally applicable to waterworks or to sewage works when "service charges" are interpreted as "water revenues" for a waterworks or as "sewer rentals or other service charges" for a sewage works.

## Combination No. 1

- (a) General obligation bonds.
- (b) Special assessment bonds.
- (c) Service charges.

## Combination No. 2

- (a) Partly general obligation bonds, partly revenue bonds.
- (b) Special assessment bonds.
- (c) Service charges.

## Combination No. 3

- (a) General obligation bonds.
- (b) Revenue bonds (limited theory).
- (c) Service charges.

## Combination No. 4

- (a) General obligation bonds.
- (b) Special assessment bonds.
- (c) Taxation.

## Combination No. 5

- (a) Revenue bonds (broad theory).
- (b) Revenue bonds (broad theory).
- (c) Services charges.

## Combination No. 6

- (a) General obligation bonds.
- (b) General obligation bonds.
- (c) Taxation.

## Combination No. 7

- (a) Revenue bonds (broad theory).
- (b) Revenue bonds (limited theory).
- (c) Service charges.

## Combination No. 8

- (a) Revenue bonds (broad theory).
- (b) Special assessment bonds.
- (c) Service charges.

The local availability or use of these combinations or plans depends on the powers granted to various classes of municipalities by state enabling acts. In accordance with the fundamental principle stated in Chapter 1, they should be judged mainly as to the fairness of the resulting annual payment or contribution by each user and by each nonuser.

Combinations Nos. 1 and 3 are likely to impose an undue burden on property since they depend upon ad valorem taxation for all major structures. Combination No. 3 is subject to the further objection that the burden of cost category (b) will fall too heavily upon users unless service charges extend to benefits to property as well as use. Combination No. 2 is more flexible and properly applied should effect a fair allocation of costs. Combinations Nos. 4 and 6 are unfair to nonusers (property).

Combinations Nos. 5, 7 and 8 offer excellent bases for fair allocation of costs if the rates and rate structures soundly apply the fundamental principle put forward by this report. In other words, if the so-called service charge comprises fairly proportioned rates to users and nonusers, involving a charge for use and a charge for benefits to property, then the resulting contributions by users and nonusers are likely to be altogether fair. It should be borne in mind that Combinations Nos. 3 and 7 are not of wide significance because only a few states embrace the limited fund theory.

The real test of a financing plan is whether or not the "needed total annual revenue is contributed by users and nonusers . . . approximately in proportion to the cost of providing the use and the benefits of the works." Once the fair allocation of the total annual cost to users and nonusers has been determined, a financing plan should be adopted which most nearly accomplishes such a fair allocation (or distribution) under existing laws and practices. A procedure for computing a fair allocation (or distribution) of the needed total annual revenue is described in Chapter 8.

Two existing methods of public financing which approximate fairness as between users and nonusers are those of the Buffalo, New York Sewer Authority, which has been in operation for over 10 years, and of the Washington Suburban Sanitary District, which has been in operation for over 20 years. These two methods of financing are described in detail in Chapter 7.



## CHAPTER 5

# Financing of Privately-Owned Utilities

### 1. GENERAL CONSIDERATIONS

Private water and sewage companies customarily finance themselves with both debt and equity capital, while publicly-owned utilities are financed, aside from taxes and assessments, principally by indebtedness. Private companies generally must provide all of their funds for acquiring and constructing property and for working capital. Payment for the use of those funds as well as the costs of operating and maintaining the property and providing for the recovery of the investment therein must come from revenues. Many states, through their public utility commissions, regulate and approve the financing of public utility companies operating within their jurisdiction.

Being regulated monopolies with earnings limited by regulatory bodies, the private companies need sufficient earnings to meet all operating expense and fixed charges and to be able to secure their capital requirements in the money markets. Attracting capital at favorable interest and dividend rates requires these companies to have rates for their services which will provide sufficient revenue to pay operating and maintenance costs and taxes of all kinds, to provide adequate depreciation, to pay interest and preferred dividends, to allow adequate dividends on common stock and to provide reasonable increases in surplus. This chapter is intended to outline some of the methods followed by private water and sewage companies in raising required funds, and to point out the part adequate rates play in attracting such funds in the open money markets.

### 2. SOURCES OF FUNDS

In general, the private utility has three sources of capital funds:

- a. Equity capital in the form of common and preferred stocks.
- b. Funds borrowed by issuing bonds or other evidence of indebtedness.
- c. Earnings retained in the business.

The amount of funds needed for additions and replacements will sometimes determine the source or combination of sources from which they are to be secured. Relatively small amounts can be raised by retaining a portion of the company's earnings each year, and limited additional funds provided through the depreciation reserve. Except, however, in times of relatively unimportant growth in the territory served by a company (and certainly this

situation rarely exists at the present time), the amount of money required to pay for additions to the company's property is so large that funds usually are borrowed or equity securities sold.

### 3. FUNDAMENTAL CHARACTER OF PRIVATE UTILITY FINANCING

Common stock forms an essential part of the financing of any private corporation. Water and sewage companies are no exception. The funds required must have a base of common equity upon which the remainder of the capital structure can be built. The proportionately large investment in fixed assets, however, makes it possible for the average utility company to secure a substantial part of its funds through the issuance of debt securities such as mortgage bonds. A sound utility, a water company in particular, has appeal for the conservative investor. The company can borrow money and sell preference stock at lower rates than would be considered reasonable return on common stock investments. The lower cost of obtaining money should be reflected in lower rates for the customers.

A company must limit, however, the extent to which it provides funds by borrowings and preferred stock because both (assuming cumulative preferred stock) place fixed obligations on the company. A reasonable balance should be maintained between debt and equity capital, with equity capital well divided between preferred and common stock. Conservative financing dictates that common equity should represent a fair portion of the total capitalization. On the other hand, debt and preferred stock carry lower interest and dividend rates than should be paid on common stocks, because of the preferential position of payments, and therefore, safety of investment, which a bondholder or a preferred stockholder possesses. In addition, the reduction in income tax payments resulting from credit for interest payments (and partial credits for preferred dividend payments on stock issued prior to October 1, 1942, or equivalent preferred stock issued in place thereof) further reduces the cost of carrying on the business.

### 4. RATIO OF DEBT

Water and sewage companies, because of the basic necessity for their services, customarily have more stable earnings than do other types of utility companies. A well-operated company with a good record of earnings should be able to assume a relatively large proportion of long-term indebtedness.

A company serving a territory affected by economic fluctuations should keep its ratio of debt to capitalization lower than one not so influenced. This would include companies having a high percentage of resort territory and companies with a high, variable

industrial load or other conditions which give rise to material fluctuations in the amount of business enjoyed from year to year.

As a result of these differences regulatory bodies, as well as financial and management experts, differ in their opinion on the ratio of debt to total capitalization. Some commissions have indicated that debt should not greatly exceed 50 per cent of the total capitalization. Some compute the ratio on the basis of the relationship of the several classes of securities and common equity. Other commissions have approved the issuance of bonds to the extent of 75 per cent of the total capitalization or net plant. In the final analysis the ratio of earnings to interest requirements may be controlling. Regardless of the debt ratio, interest requirements should be safely covered from two to three times depending upon the company's history of earnings, character of territory served, requirements of the money market and similar factors.

#### 5. EQUITY—PREFERRED AND COMMON STOCK

The remainder of the company's capitalization may be divided between preferred stock and common equity. Common equity consists of the common stock plus surplus. Preferred stock has the advantage of a lower dividend rate than normally prevails for common stock, since it takes precedence in earnings, but the amount cannot be too large since preferred dividends are essentially a fixed charge (most preferred stock being cumulative). Here also the amount of preferred stock must be governed by the earnings of the company. It is considered advisable for a private water or sewage company to have a substantial capitalization in common equity.

Preferred stock generally has no maturity but a considerable number of preferred stock issues require payments to a sinking fund, which, in effect, pay off the preferred stock issues in time. Most preferred stock issues are callable upon 30 days notice. The call price varies depending upon several conditions. Many issues provide a call price equal to the selling price plus one year's dividends to govern a short period after issuance and scale the figure down from year to year thereafter. In the case of municipal acquisition of a private company the call price generally is at par or original offering price whichever is greater.

Preferred stocks of water companies have recently carried dividend rates of from 3.9 to 4.75 per cent. Preferred stocks also carry restrictions and special provisions designed for the protection of the stockholders and for the improvement of the company. To-day, it is not uncommon to find a 2 or 2½ per cent sinking fund in the preferred stock. A dividend restriction similar to that later discussed under bonds, is common. The issuance of additional preferred stock is usually prohibited unless the company's earnings

equal at least one and one-half times interest and dividend requirements, and a ceiling is sometimes placed on the amount of funded debt or on the total of funded debt and preferred stock to be outstanding.

## 6. BONDS

The majority of privately-owned water and sewage companies create long-term debt in the form of an open-end first mortgage on their operating property. This has proved advantageous in that such a mortgage is workable from the company's point of view and affords security of a quality that permits a low rate of interest. Some companies, where earnings justify, have also used a general mortgage in addition, which ranks junior to a first mortgage. Other companies with adequate earnings have issued debentures either in lieu of or in addition to the first mortgage. Both the general mortgage bonds and debentures would carry higher rates of interest than the first mortgage bonds.

These types of indebtedness place certain restrictions on the company which are written into the indenture relating to the security issue. Such provisions are designed to protect the bondholder and to maintain his position as time passes. They attempt to keep the bondholder in at least as good a position throughout the life of the security as at the time of original issue. Perhaps the most common restriction is that placed on common dividends. This usually limits the dividends paid on common stock to a percentage of the earnings since the date of the mortgage, and may vary between 50 and 100 per cent of the company's earnings. It sometimes varies with the percentage of common equity to total capitalization. If the percentage of common equity increases, the amount of earnings which can be paid out in dividends also increases. The so called A B C provision promulgated by the United States Securities and Exchange Commission provides that dividends be limited to 50 per cent of earnings if the common equity is less than 20 per cent of the capitalization, and to 75 per cent of earnings if the common equity is between 20 and 25 per cent with no restriction if the equity is more than 25 per cent.

Another frequent restriction is a covenant that the company will expend or reserve a fixed percentage of revenue each year for maintenance and depreciation of its property. Improvement funds are also provided in some bond indentures. These ordinarily stipulate that property additions equal to 1 to 2 per cent of the principal amount of the bonds be set aside each year, thus increasing the amount of security back of the outstanding bonds. Outright sinking funds are often placed in general mortgage or debenture issues, but are not found frequently in first mortgages. Open-end mortgages

usually provide that additional bonds may be issued only to the extent of 60, 65, or 70 per cent of the net property additions made after the date of the mortgage.

Private water utility bonds are currently sold with interest rates ranging from 2.5 to 3.5 per cent. Most present-day bonds are issued for 25 to 30 year periods. They are generally callable at their par value, or original offering price, if higher, and accrued interest in the event of municipal acquisition. They are otherwise callable at premiums, gradually reducing from one year's interest in the early years after issuance to nothing in the final years of the issue.

#### 7. OWNERSHIP

Common stock represents the real ownership in a company. It ranks after all other debt and preferred stocks, and because of this junior position and inherent risk, it is entitled to a larger dividend return than preferred stock. This can only be assured, of course, by water rates which provide enough for the common stockholder after all other charges. Without this assurance there is no inducement to the common stock investor to put his funds into a water company by purchasing its common stock. Any intelligent bond or preferred stock purchaser requires a reasonable amount of common equity behind his investment.

#### 8. LOANS

Short-term bank loans also have a place in the financing of a private company. They should be used, however, only as an interim measure and to provide funds while long-term financing is being arranged. They provide a source of funds on short notice and permit the company to proceed with needed construction work while long-term financing is being arranged.

#### 9. METHODS OF SALE OF SECURITIES

The private company has more avenues for selling its securities than a municipal system or authority since the latter more frequently must offer its securities at competitive bidding. The private company has the following means at its disposal:

- a. Competitive bidding.
- b. Private sale to institutional investors.
- c. Direct sale to its water customers.
- d. Direct sale to present stockholders.
- e. Direct sale to the public.

Of the foregoing, the first two methods are the most widely used today. Under competitive bidding the successful buying syndicate underwrites the issue, thus assuring the sale of the securities if the price is acceptable to the company. Direct sale by the company to customers, stockholders or the general public is not used

extensively today because the work and expense of issuance are greater, and there is no guaranty that the entire issue will be sold.

Private placement of securities with institutional investors, largely insurance companies, has been used rather frequently by private companies. It can claim greater simplicity and less flotation expense. Any public offering of securities unless sold entirely within the state in which the utility is incorporated comes within the province of the United States Securities and Exchange Commission and the issue must be registered with that commission in addition to being authorized or approved by any state regulatory body having jurisdiction. This involves the expenditure of time and money not entailed by a private sale. On the other hand, free competitive bidding brings a sale out into the open where the forces of competition may work to the advantage of the company with respect to the "price" of the capital sought. The size of the issue may determine whether interest savings would result from a public sale since a small issue may have a restricted field.

A "finder" is frequently used in negotiating a private sale, and a fee (usually based on the size of the issue) is paid for this service. This expense is not incurred in a public offering, although it may be offset by payments made for advice and counsel of investment bankers preparatory to asking for bids on public sale. Insurance companies are the largest buyers of securities today, regardless of the method of sale.

#### 10. SUMMARY

The privately-owned water and sewage companies with good management and a record of good earnings find themselves in a favorable position in the money markets. Whether they offer bonds or stocks, the stable nature of their operations has a favorable appeal for conservative investors and the money rates they can get compare favorably with those of other companies. This position can be maintained only so long as they continue to have earnings sufficient to pay interest and preferred dividends and, in the case of common stock, to pay a reasonable return in the form of common dividends. It should be apparent that in order to do this, they must have rates which will provide adequate earnings.

## Determination of Annual Revenue Requirements

### 1. GENERAL CONSIDERATIONS

The first step in the establishment of rates or tariffs is the determination of annual revenue requirements. Frequently, the approach to this problem may be different, depending upon the character of ownership, that is, whether public or private. In the past, revenue requirements of publicly-owned systems have often been determined on a cash basis, whereas determinations in respect to privately-owned systems have been according to a standard which involves, among other things, the computation of a fair return on a rate base. For convenience, the determination of the revenue requirements of privately-owned utilities will be discussed first.

### 2. PRIVATELY-OWNED UTILITIES

The standard or orthodox method of determining the annual revenue requirements of a privately-owned water works or sewerage system is by adding together:

- a. Operating expenses,
- b. Depreciation,
- c. Taxes, and
- d. Return on a rate base.

The computation may be illustrated by reference to appended statements A and B. Referring to Statement A, which is a statement of expenses of a hypothetical company, it will be seen that the total of "revenue deductions", consisting of operating expenses, depreciation and taxes, aggregated \$3,661,598. To this total there must be added a return on a rate base discussed below.

The theory underlying the foregoing determination is that a utility must be allowed sufficient revenues to cover all of its operating outlays and, in addition, a fair return on the capital invested in the enterprise. Accordingly, interest on debt and dividends on stock are not, as such, treated as elements of annual revenue requirements, but instead are to be paid out of the fair return which is the compensation for the capital invested.

By far the greatest controversy in the field of public utility rate making in the last half century has revolved around the method of determining the rate base.<sup>1</sup> It was contended, on the one hand,

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<sup>1</sup> Because of the welter of cases dealing with this controversy and the impossibility of adequately dealing with them here, the citation of cases is omitted.

that the rate base should consist of the cost of the properties devoted to public service, less accrued depreciation, plus an allowance for working capital (frequently called the investment or prudent investment method); on the other hand, it was contended that the rate base should consist of the present fair value of the properties used and useful in the public service, plus working capital (fair value method). Practice at the present time varies, some agencies adhering to the fair value base, whereas others employ the investment standard.

In both the investment and fair value methods, it will be noted, an allowance must be made for working capital. Working capital consists of two elements, cash and materials and supplies. The cash element is often taken as one-eighth of the annual operating expenses, not including depreciation (a non-cash expense), and taxes (which are usually paid a considerable time after pertinent revenues are collected). In this hypothetical case, cash working capital in the amount of \$225,000 and materials and supplies in the amount of \$700,000 will be assumed.

By referring to the appended Statement B, it will be seen that the cost of plant was \$50,000,000 in the illustrative case and that the depreciation reserve was \$8,000,000. According to the investment (sometimes called "prudent investment") standard, if the costs were proper and the depreciation reserve reasonable, the plant base would amount to \$42,000,000 (cost \$50,000,000 less depreciation reserves \$8,000,000), to which there would have to be added working capital.

Under the fair value theory the plant would be valued, which value might be more or less than cost. In the valuation process estimates would have to be made of the gross value and also existing depreciation, there being differences of opinion as to whether the estimate of the latter should relate to the depreciation reserve requirement (proper depreciation reserve), or to what is variously called "observed," "actual" or "sustained" depreciation.

For present purposes, the investment basis will be illustrated. Under the assumptions made, the investment rate base would be as follows:

Cost of Plant .....	\$50,000,000
Less Depreciation Reserve.....	8,000,000
<hr/>	
Net Plant .....	\$42,000,000
Working Capital .....	925,000
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Rate Base .....	\$42,925,000

The next problem is the determination of the fair rate of return. Many elements must be considered in arriving at this rate; complete discussion is beyond the scope of this study. Some of the



elements to be considered are the risk of the business, the return necessary to attract capital, the cost of money as reflected in securities outstanding and the current rate for securities of the nature issued by the company and the industry. For illustrative purposes it will arbitrarily be assumed that only two elements need be considered in this example and that these elements are (1) cost of borrowed money and (2) fair earnings for stock equity; and further, that the following capital costs prevail: 4% for bonds and 8% for common equity with bonds and stock each constituting 50% of the total capital. Under the assumed conditions the rate of return would be 6%, consisting of—

50% of bond rate (4%) .....	2%
50% of stock rate (8%) .....	4%
Rate of Return .....	6%

Thus, under the assumptions specified (investment rate base), the fair return element of annual revenue requirements would be 6% of \$42,925,000 or \$2,575,500.

The annual revenue requirement of the hypothetical private company under the assumption made would then be \$6,237,098 as shown by the following tabulation:

Operating expenses ..	\$1,818,398
Depreciation .....	576,000
Taxes .....	1,267,200
Return .....	2,575,500
<hr/>	
Total .....	\$6,237,098

In the foregoing illustration the only difference between the fair value and the investment basis would be in the amount of return.

In estimating annual operating expenses, eliminations must be made from the experience in the test year for non-recurring items and allowances must be made for known increases in expenses, such as higher wage rates put into effect toward the close of the year. Depreciation expense should be calculated in such a manner as to spread the cost of plant, less salvage value, over plant service life in a substantially uniform manner.

It will be noted that income tax is treated as an allowable item to be included in the determination of annual revenues. This is the well-established practice. It is justified by the method of computing the rate of return. If incomes taxes are not allowed directly in determinations of annual revenue requirements for privately-owned companies, then the rate of return would have to be stepped up or investors would avoid the stock of the utility.

After determining annual revenue requirements, rate schedules or tariffs must be devised to yield the amount thereof. This subject is treated in Chapters 7 and 8 of this report.

### 3. PUBLICLY-OWNED UTILITIES

Municipal and other publicly-owned water and sewage works usually are not operated for profit in the ordinary sense of that term, but are generally organized to serve the public on a cost basis. In some jurisdictions, their revenue requirements may be determined in the manner illustrated for privately-owned utilities, but in most cases such requirements are determined on a cash basis which will be illustrated.

Publicly-owned utilities finance in a manner different from privately-owned works. Privately-owned works finance through debt and equity securities. Public works are generally financed through borrowed capital, except to the extent that additions and improvements may be financed out of revenues. In some instances publicly-owned systems are financed to a considerable extent by funds provided by the municipality through the issuance of general obligation bonds and the exercise of the municipal taxing power. The funds so provided, in effect, represent equity capital provided by the municipality, and to the extent that capital is provided in this manner the utility is relieved of a direct debt obligation. It is necessary in determining the revenue requirements of public systems to give adequate consideration to the special debt requirements, including provision for the liquidation of the debt. Refunding of all or a part of the debt at or near the maturity date is not practiced in the case of public systems as it is in the case of private systems.

Thus, the debt may be payable in installments (represented by bonds) in which event sufficient cash must be realized from revenues to pay annually all operating costs, interest and debt installments. If all the debt matures at one time (represented by term bonds) funds must be accumulated in the interim in the necessary amount. This emphasis on cash needs, which in turn is geared to method of financing, has been chiefly responsible for the cash basis, so widely practiced, of determining annual revenue requirements of municipal and other public systems.

The theory of the cash basis is that the required revenue is the amount necessary to make the cash outlays as they fall due. If the debt is due at one time, as in the case of term bonds, then a fund must be accumulated to pay off the debt at maturity. If the debt is payable in installments, say yearly, the cash must be collected to discharge the installments as they come due. When the cash basis is used, special attention must be given to the cost of replacements of property which are not chargeable to operating expense. Thus, if a large pump is to be replaced in, say, ten years, the calculation of required revenues must take the fact into consideration.

In order to portray the cash basis more clearly, another illus-

tration will be given. In this connection the following assumptions are made:

1. The annual operating expenses are the same as in Statement A, \$1,818,398.
2. No taxes or tax equivalents are payable.
3. The debt consists of \$42,000,000, 3% revenue bonds issued at face value and payable in 30 years.
4. The average annual cost of plant replacements which are not included in operating expenses amounts to \$200,000.

The annual revenue requirements would consist of the following:

Operating expenses .....	\$1,818,398
Annual interim replacements .....	200,000
Interest (3 % on \$42,000,000) .....	1,260,000
Amortization of debt (periodic sinking fund amount which compounded at 3 % will liquidate the debt at maturity) .	882,808
<hr/>	
Total annual revenue requirements .....	\$4,161,206
<hr/>	

If the debt were to be liquidated in installments, the theoretical annual requirement for interest and debt retirement would be \$2,-142,808 which is the same as the interest and amortization shown in the above tabulation.<sup>2</sup>

It will be seen that the cash basis is essentially a method designed to bring enough cash into the enterprise to take care of the cash obligations. In contrast, complete liquidation of the debt of a privately-owned utility in installments over its life is usually not required and, in addition, a large part of the capital is represented by stock. These differences in financing emphasize the importance of cash requirement studies in the determination of revenue requirements of the public systems. It should be pointed out that the use of the cash basis may have the effect of discrimination between ratepayers in different periods of time during the life of the utility, particularly if the debt is paid off over a short period. The ratepayers who are required to meet the amortization costs of the initial debt may carry a heavier burden than subsequent ratepayers if the latter are relieved of amortization and interest costs.

Considerable confusion is sometimes reflected in comparisons relating to depreciation of plant and amortization of debt in respect to public systems. It is sometimes said that both depreciation and amortization should be recognized and just about as frequently, it

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<sup>2</sup> This, of course, assumes the same interest rate could be secured by the municipality on its serial bonds as on other long term bonds.

seems, that only one of these items should enter into the revenue calculations.

Actually, depreciation, as here used, is a method of accounting for the consumption of capital invested in plant. Such accounting can be completely harmonized with provision for the amortization of debt. For example, let the assumed facts stand as in the last illustration with the further assumption that depreciation expense in the amount of \$576,000 should be accrued annually as shown in the first illustration. The annual expenses then required to be recovered through revenues would be as follows:

Operating expenses .....	\$1,818,398
Depreciation expense .....	576,000
Interest .....	<u>1,260,000</u>
Total .....	<u>\$3,654,398</u>

In addition to the operating expenses and interest, cash would be required for interim replacements and periodic payment for debt amortization, \$200,000 and \$882,808 respectively, or a total of \$1,082,808 for these two items.

Depreciation expense does not require an annual cash outlay. Depreciation accounting is the charging off of a *pro rata* part of that cost of plant to annual operations. The cash cost is incurred before depreciation is charged. Accordingly, cash realized through inclusion of depreciation as a recoverable expense may be applied toward debt amortization or the financing of replacements. Thus the cost of replacements and debt amortization in the foregoing illustration amount to \$1,082,808. The deduction of \$576,000, the amount arising from depreciation practices, leaves a balance of \$506,808 to be made up from earnings. The total expenses, including depreciation, shown above, amount to \$3,654,398. By adding the additional cash requirement of \$506,808 to that figure we arrive at the total annual revenue requirements. The amount is \$4,161,206, the same amount shown in the previous illustration.

The figures in the illustrations just given would appear in the income account or income statement as follows:

Revenues .....	\$4,161,206
Operating expenses .....	\$1,818,398
Depreciation expense ....	<u>576,000</u>
Total revenue deductions.....	<u>2,394,398</u>
Operating income .....	<u>1,766,808</u>
Interest expense .....	<u>1,260,000</u>
Net profit .....	<u>\$506,808</u>

It will be noted that the amount of \$506,808 is exactly the amount which was added to the total expenses of \$3,654,398 to obtain the additional cash required to meet all the cash obligations. Expressed another way, it is necessary for the system to operate at a profit of \$506,808 in order to pay off the debt more rapidly than depreciation accrues. The life of the debt, as set up in this illustration for 30 year liquidation, is shorter than the actual life of the plant.

Sometimes it is said that the public system should charge sufficient rates to yield a fair return on a rate base according to the practice of privately-owned utilities.<sup>3</sup> Applying this reasoning but leaving out of consideration for the moment the question of taxes, and assuming a 6% return (\$2,520,000) on an investment rate base of \$42,000,000, the income statement would appear as follows:

Operating revenues .....	\$4,914,398
Operating expenses .....	\$1,818,398
Depreciation expense ....	576,000
	<hr/>
Total Revenue deductions .....	2,394,398
	<hr/>
Operating income (6%) .....	2,520,000
Interest expense .....	1,260,000
	<hr/>
Net profit .....	\$1,260,000

It was demonstrated above that an annual net profit of \$506,808 was all that was required in order to meet cash obligations. A profit of \$1,260,000 would more than meet requirements. The additional profit would not be needed by the utility system itself, unless required in whole or in part for additions or improvements.<sup>4</sup> Whether an amount should be collected in rates and used to help defray other costs of government is not a legal, engineering, accounting or financial question but a political or policy question. It is intended here only to show that under the assumed conditions the additional profit indicated is not a required annual revenue item as far as the utility department itself is concerned. As a matter of fact, the need for water and sewage systems is so great in so many places that every effort should be made to encourage such projects. Insistence on operating them at a high profit may prevent worthwhile projects from being promoted.

Similar questions are raised in respect to taxes. Whether the

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<sup>3</sup> Cf. *Shirk v. City of Lancaster*, 313 Pa. 158, 169 Atl. 557 (1933).

<sup>4</sup> Diversion of funds is more fully considered in Chapter 4.

utility department of a municipality should pay taxes similar to the taxes paid by privately-owned utilities again is not a technical question but a political one concerning which there are differences of opinion. It is an easy matter to add taxes to the other expenses in computing revenue requirements if the utility department is required to pay taxes or tax equivalents. Again, however, insistence on tax equivalents may impose such a burden, particularly on a new project, as to discourage its promotion.

Of somewhat the same nature is the question as to whether substantial additions to the utility system should be paid for out of current revenues or whether they should be funded. This is again a policy or management question which may depend upon many facts and circumstances, except, it might be noted, that when the system is new and heavily bonded it is much more difficult to take care of such additions out of current revenues than when the system is well-seasoned and the debt is reduced. Obviously, a debt-free system is in a much better position to make plant additions out of current revenues than is a system which is heavily bonded.

It is believed, however, that the utility department should charge other departments for utility services directly rendered to them and by the same token, the utility department should be charged for the services directly rendered to it by the other departments of government. Any charges to the utility department should be included in the operating expenses to be recouped in annual revenues.

After the needed total annual revenue has been determined in a fair amount and in a logical manner, it remains to determine who and what shall contribute to the water or sewage works to provide the needed total annual revenue. This subject is treated in Chapter 8 which discusses the computation of rates and rate structures.

#### STATEMENT A

##### *Expense Schedule*

##### *Operating Expenses*

Source of Supply .....	\$ 2,920
Low Lift Pumping .....	111,829
Purification .....	249,025
Steam Power Pumping .....	199,845
Electric Power Pumping .....	237,058
General Production Expense .....	62,786
Sewage Treatment Expense .....	32,945
Transmission and Distribution .....	425,198
Commercial Expense .....	244,039
Administrative and General Expense .	252,753

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Total Operating Expenses ..... \$1,818,398

Depreciation .....	\$576,000
Taxes	
General .....	\$360,000
Income .....	907,200
	<hr/>
	1,267,200
	<hr/>
Total Revenue Deductions .....	\$3,661,598
Interest Expense .....	630,000
	<hr/>
Total Expenses .....	\$4,291,598

**STATEMENT B**  
*Condensed Balance Sheet*

*Assets*

Plant .....	\$50,000,000
Less Reserve for Depreciation .....	8,000,000
	<hr/>
Plant Less Reserve .....	\$42,000,000
Cash .....	300,000
Materials and Supplies .....	700,000
	<hr/>
Total Assets .....	\$43,000,000

*Liabilities and Capital*

Bonds .....	\$21,000,000
Common Capital Stock ...	\$15,000,000
Surplus .....	6,000,000
Common Stock and Surplus .....	21,000,000
Current Liabilities .....	1,000,000
	<hr/>
Total Liabilities and Capital .....	\$43,000,000

## CHAPTER 7

# Present Practices In Raising Total Annual Revenue for Water and Sewage Works

### 1. GENERAL CONSIDERATIONS

The function of this chapter is to review present practices in raising the total annual revenue for water and sewage works. This review will complete the ground work for the vital constructive task of erecting sound procedures for computing fair rates and rate structures.

It can be said at once that there is, at the present time, no uniform practice in determining rates and rate structures. Scant consideration has been given to fundamental principles. Too often it has been a matter of adopting any plan which would produce sufficient revenue with the fewest complaints. There are, however, a few plans in use, which reflect much time and effort in their preparation, in which the rates and rate structures and the resulting allocation of the total annual costs are substantially fair to users and to property.

### 2. WATER WORKS

The greater number of water works were built before the present high cost of labor and materials; when fewer tax dollars were needed; and each dollar collected paid for more services than now. The general public did not demand all the services it now demands, and there were usually a few dollars left for additional service within the ad valorem tax limits. Originally the water rate had only to be sufficient to pay operation and maintenance expenses, while capital costs and other expenses were paid from some other source. The financing of water works construction from rates is, therefore, a relatively recent practice and rate schedules to provide such revenues are comparatively new.

There is much evidence to indicate a need for extensive studies of this problem. Some of the older water works are becoming too small or are in need of modernization; new inventions and services are requiring more water; and present tax dollars are not available in amounts adequate either for fixed charges on construction or for operation and maintenance.

#### a. *Existing Water Rates*

Existing water rates fall into two large categories; based on (1) the sale of a commodity, and (2) the furnishing of fire protection.

##### (1) *Commodity Rates*

Commodity rates are those charged to the customer to cover the cost of producing and delivering this commodity, water, to the customer. The following rate bases are in common use.



## (a) Flat Rates for Unmetered Customers

This class of rate is used in both large and small cities. It is popular where the water supply is unusually plentiful and where it can be provided at relatively low cost. It is employed in some arid regions where the maintenance of water rights encourages water use. Some of our largest cities still have flat rates for all except large users; a carry-over from their early practices which they unfortunately have not been able to change.

Flat rates, usually based on the number and types of installed fixtures, the number of rooms in the building, the number of occupants, or the type of occupancy of the building, are, at best, only estimates of the average uses of water.

## (b) Rates Based on Property Valuation

This class of rate, based on either the value of the property for taxing purposes or on its value for rental purposes, is used in Canada and a few cities of the United States.

The water tax in Montreal is seven and one-half per cent of the rental value for ordinary customers and twelve per cent for hotels of less than twenty rooms. The same rate is charged for inns and restaurants. The rate for any metered service in Montreal is \$0.15 1/3 per 1,000 gallons.

## (c) Uniform Metered Rates

A single rate charge for water, uniform for all quantities of consumption, came into use following the introduction of water meters into water works practice. That is, the customer using 100,000 gallons per month pays exactly ten times what a customer using 10,000 gallons per month pays. An article in the October 1948 issue of the American Water Works Association Journal reported that, as of 1945, of four hundred thirty-four communities, with populations greater than 10,000, only eighteen cities, or slightly more than four per cent, continued to use uniform rates.<sup>1</sup>

## (d) Sliding Scale Method Rates

The development of water works management disclosed the fact that the cost of service to different classes of customers was not the same. It soon became apparent that a fair distribution of cost entitled the customer using a large amount of water to a lower rate for the increased amount than that charged to another customer using a small amount of water. The result is a graduated rate schedule, called by such names as "sliding scale," "block" or "step."

The following example illustrates such a rate schedule:

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<sup>1</sup> Schroeffer, Johnson, Seidel and Al-Hakim, *A Statistical Analysis of Water Works Data for 1945*, 40 AM. WATER WORKS ASS'N. JOURN. 1067 (1948).

Block or Step in Gallons Per month	Rate in Cents per 1,000 Gallons
First 25,000 .....	20.0
Next 225,000 .....	15.0
Over 250,000 .....	10.0

This type of rate schedule, if properly designed, should be based on the cost of supplying water to each class of users.

This kind of rate schedule attempts to divide the cost of water service into three elements; namely, (1) the capacity cost, or the cost of readiness-to-serve; (2) the commodity cost, or the cost of producing and delivering the water, and (3) the customer cost, or the cost of meter reading, billing, collecting, and accounting.

#### (e) Additional Provisions in Rate Schedules

A minimum rate, with or without a service charge, is usually incorporated into uniform rates, or sliding scale meter rates. These schedules stipulate a minimum charge for the collection period, and for both uniform metered rates and sliding scale rates this minimum charge usually includes some quantity of water, say up to 3,000 gallons per month. This item may or may not include a service charge for the meter. If a meter charge is included, this charge varies with the size of the meter.

Miscellaneous charges incorporated into some rate schedules include such items as "construction water," "sprinkling water," and "irrigation water." In each of these cases the service is a short duration, limited to the season of the year, or to geographic location. The charge is, therefore, too variable to report except as a matter of general interest.

Other charges, sometimes incorporated into the published rate schedules, include a fee for making a water service tap, for the service connection, and for setting the meter. Such charges are found to vary from \$10 to \$100 depending on the locality and need for revenue. The charge is usually higher for services outside the geographical limits of the governmental unit.

#### (2) Fire Protection

Charges for fire protection do not follow any uniform practice. The cost of such protection varies with the size of the water works and the community which it serves.

The collection of income for public fire protection is achieved through charges against the municipality or other governmental agency or through charges against the owners of private property. The charge in the former case may be either an annual lump sum or a charge per hydrant and per linear foot of main. The charge thus becomes a source of revenue from general taxes which is often offset in part if "free-water" is furnished to the governmental agency

for public buildings, for parks, and playgrounds or similar service for which no payment is made.

*b. Typical Bills*

A 1949 survey of metered water-rate structures made by the Philadelphia Bureau of Municipal Research,<sup>2</sup> and covering the fourteen largest cities in the United States, disclosed a wide variation in the rates for equivalent volumes of water measured by a 5/8 inch meter as shown in Table I.

Doubtless some of the variations were the result of different local conditions, such as the source of supply, the quality of the raw water, and the amount of pumping. Some cities have no choice but to spend more than others on their water systems and their operation.

No two cities had identical rate structures. Several rates involved both a yearly minimum charge varying with the meter size and a flat rate for all additional water over the minimum allowance. The two largest cities, New York and Chicago, charged a flat rate for all water used, regardless of the meter size or volume used. Wherever a sliding scale meter rate was in use, the rates decreased as the volume consumed increased and most of the municipalities supplemented the metered rate with a ready-to-serve charge, graduated by the meter size.

Philadelphia, Buffalo, Cleveland, Baltimore, and Los Angeles had a minimum charge figured on an annual, quarterly, or monthly basis; Detroit, San Francisco, Pittsburgh, and Milwaukee, used ready-to-serve charges, and St. Louis featured a special sliding rate for the benefit of industries using more than 60,000 cubic feet of water in six months.

The data indicates that median rates for large and small communities are approximately the same, and an increase in the per capita consumption in cities with low rates as compared with communities having high rates.

The Philadelphia report also presented a comparison of rates charged by public and private water works which indicated that the median rates were higher in private water works for all classes of consumption. One illustration showed a private water works rate of \$1.60 per 1,000 cubic feet per month for a consumption of 10,000 cubic feet, as compared with a rate of \$1.36 for a comparable publicly-owned water works. However, both the rates and revenues per capita of private and public operation are brought closer together when account is taken of the fact that the median amount of the taxes paid by private companies serving larger communities

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<sup>2</sup> Metered Water and Sewer Charges in Fourteen Largest Cities of the United States (1950).

TABLE I

## ANNUAL BILLS IN 14 CITIES FOR COMPARABLE VOLUMES OF WATER (5/8 inch meter)\*

30,000 Gal. (4,000 Cu. Ft.)		60,000 Gal. (8,000 Cu. Ft.)	
City	Bill	City	Bill
San Francisco, a. ....	18.54	San Francisco, a. ....	27.62
Buffalo, b. ....	13.20	Baltimore. ....	16.00
Los Angeles, b. ....	13.20	Pittsburgh, a., e. ....	14.00
Washington, b. ....	10.94	Buffalo, b. ....	13.20
Baltimore, b. ....	8.00	Los Angeles, b. ....	13.20
Boston, b. ....	8.00	Boston. ....	12.00
Philadelphia, b. ....	8.00	New York. ....	12.00
Pittsburgh, a., e. ....	8.00	St. Louis. ....	11.80
Detroit, a. ....	6.56	Washington. ....	11.39
New York. ....	6.00	Detroit, a. ....	10.24
St. Louis. ....	6.00	Philadelphia. ....	9.80
Cleveland. ....	5.75	Cleveland. ....	8.75
Milwaukee, a. ....	5.70	Milwaukee, a. ....	8.40
Chicago, d. ....	2.40	Chicago, d. ....	9.00
		Chicago, d. ....	4.80
45,000 Gal. (6,000 Cu. Ft.)		112,500 Gal. (15,000 Cu. Ft.)	
San Francisco, a. ....	23.08	San Francisco, a. ....	43.51
Buffalo, b. ....	13.20	Baltimore, a., e. ....	30.00
Los Angeles, b. ....	13.20	Pittsburgh. ....	24.50
Baltimore. ....	12.00	Boston. ....	22.50
Pittsburgh, a., e. ....	11.00	New York. ....	22.50
Washington, b. ....	10.94	Los Angeles. ....	22.20
Boston. ....	9.00	St. Louis. ....	21.30
New York. ....	9.00	Washington. ....	17.69
St. Louis. ....	9.00	Detroit, a. ....	16.68
Philadelphia. ....	8.90	Buffalo. ....	16.50
Detroit, a. ....	8.40	Cleveland. ....	14.00
Cleveland. ....	7.25	Milwaukee, a. ....	13.13
Milwaukee, a. ....	7.05	Philadelphia. ....	12.95
Chicago, d. ....	3.60		

a. Includes service charge.

b. Minimum charge.

c. Minimum use of 60,000 Cu. Ft. during a six-month period.

d. Less 8% discount if paid within ten days.

e. Less 2% discount if paid within ten days.

\*Where billing is oftener than yearly, it is assumed that volumes are equal for each billing period and total of bills is equivalent to annual volume. For simplicity, a ratio of 7.5 Gal. to 1 Cu. Ft. is used, instead of 7.48.

is 16.65 per centum of their total revenues.<sup>3</sup> Thus, no real comparison or conclusion can be made without a careful study of all the local conditions in each case.

### c. Summary

There is no general indication that in computing rates and in shaping rate structures, consideration has been given to whether the total annual cost of water works may be or should be financed

- (1) wholly by property,
- (2) wholly by users, or
- (3) partly by each in some proportion.

Likewise, there is insufficient information to indicate methods of revenue collection based on allocation of the needed total annual revenue on one or more of the following sources:

- (1) taxes,
- (2) frontage assessments,
- (3) other "benefit" assessments to property,
- (4) charges or rates for use,
- (5) fire protection charges paid by property taxes or for private fire protection services.

The studies indicate amazing confusion about the basis for the determination of fair rates and a wide diversity not only in existing water rates but also in new schedules proposed by water works engineers. They point to the need for the present study. There are always exceptions to the general rule. An exception, which involves both water and sewage works financing and substantially achieves fairness as between users and non-users, will be discussed at the end of this chapter.

## 3. SEWAGE WORKS

Sewers have been used for many years, but the operation of sewage treatment works is a relatively new municipal function. It has created a financial problem since the usual sources of municipal revenues have been largely preempted for other uses. This has resulted in a search for additional revenues and has stimulated interest in special charges for the use and benefits of sewage works. These "sewer rentals," "sewer service charges," or more properly, "sewage service charges," are based on some sort of rate schedule. They have become a source of badly-needed revenue in a period of high costs and strongly competing governmental demands for funds. Since municipal utility rates are not generally subject to utility commission regulation, municipalities are usually free to raise as much or as little revenue through sewage rates as they

<sup>3</sup> *Op. cit. supra* note 1, at 1096.

choose, subject, of course, to economic and special statutory limitations.

One of the most important problems in the field of government is the proper distribution of the cost of operations among the various members of the community. In the case of sewage works it is a question of how much revenue must be raised and what portion of the sewage works cost should be paid by users and what portion by property, each in accordance with fair rates.

An examination of current practices indicates that municipalities charging for sewage uses and benefits show wide variations in the extent to which such revenues are relied upon to meet the cost of the sewage works. Some use such revenues to finance the construction of new sewer systems or new treatment works, others to pay the debts on existing sewage works, and still others to pay only the current operating and maintenance costs of the sewers or the treatment works, or both. The wide range in the amount of revenue raised by this method and the bases for its collection make it appear that few rate structures have been scientifically designed, but that all efforts have been made to raise some definite amount of revenue in the easiest manner, rather than to fix the rates on a fair basis in true relation to the cost of providing for the use and the benefit of the works.

The design of rates and rate schedules for sewage works has been based on several factors, which include:

- a. The financing method used in construction.
- b. The sewage characteristics.
- c. The quantity of sewage.
- d. The degree of treatment.
- e. The effect of the charges on the various classes of individuals who pay them.

Since the collection of sewage charges transfers some of the burdens of government from one group to another, the system should be considered in connection with the entire revenue system of the local government.

#### *a. Existing Rate Structures*

The following information is based on the answers to two questionnaires prepared and sent to municipalities by the American Public Works Association. The first questionnaire, sent in 1939, brought 116 answers; and the second, sent late in 1949, to 456 municipalities of over 5,000 population, brought answers from more than fifty per cent of the cities.

The returns disclose the use of six principal bases in fixing rate schedules for sewage charges; but practically everything, except the color of plumbing fixtures, has been used as the basis for such

charges. The principal bases may be described under the following broad categories.

(1) *Uniform Rates*

Uniform rates have been the simplest and the easiest to establish. They attempt to spread the cost uniformly, but the charges seem to have been determined by merely setting a rate sufficient to produce the required amount of revenue. They, therefore, do not represent the amount to be paid for either the actual or presumptive use of the sewage works, and the result is unfair charges. A commercial laundry may pay no more than a private residence. This type of rate schedule has nothing to recommend it, except its simplicity. Its use is restricted to small communities and the annual rates range from \$3 to \$10.

(2) *Number or Size of Sewer Connections*

This type of rate, similar to the uniform rate, is based on the fact that a property with more than one sewer connection offers presumptive evidence of a greater use of the works. Rates may also vary with the size of sewer connections, and a two-family building may be charged more than a single family residence even though there is only one sewer connection. The use of this type of schedule is also restricted to small communities where important differences among properties do not exist to any great extent. The rates for a single connection may vary from \$15 to over \$25 per year.

(3) *Type of Property*

Charges have been based on the type of property, on the rather rough presumption that the size and kind of a commercial or industrial plant determines the use of the sewage works. Although some cities use but seven or eight classes, others use forty or fifty which serve to eliminate many inequalities which would otherwise exist. Maximum annual charges for the various property classifications vary from \$12 for a residence or railway depot to \$60 for a commercial garage.

(4) *Number and Type of Plumbing Fixtures*

Use of the number of plumbing fixtures as the basis for rate structures has found favor where the water works is privately owned, where water meters are not installed, or where it seems desirable to favor the poorer classes of users. This base may roughly measure the use of the works, but its administration requires frequent and costly inspections of plumbing installations to assure complete and accurate billing. Additional units of any type are usually charged at a lesser rate, and annual rates for the different types of fixtures range from 20c for a hotel bathtub to \$1.80 for a public garage wash rack.

(5) *Water Consumption*

Water consumption represents the most accurate measure of the

relative use of a sewage works and, in general, it results in the fairest distribution of the use portion of the total annual revenue. The use of the method, however, is limited to an entirely metered water works, which is publicly-owned, unless arrangements can be made with the private water company to make its meter readings available.

There are four variations of this type of rate, each of which deserve notice.

(a) Metered Water Charges

A sewage charge based on metered water use represents the most accurate measure of the relative use of the sewage works, generally resulting in the fairest distribution of charges. However, inaccuracies and inequalities are introduced when all the water used is not discharged into the sanitary sewers, as, for example, where some is used for lawn sprinkling. The method, when used without appropriate adjustment, is open to the objection that it does not take into account the benefits to undeveloped property. This plan requires adjustments for both users and properties if contributions are to be made in proportion to use and benefits.

Rate schedules of this type usually include a minimum annual charge which is found to vary from approximately \$1 to \$9. The rates, usually on a sliding scale, with a lower charge for greater quantities, indicate maximum charges in the first block approximately fifty per cent more than the minimum charges of the last block.

(b) Combined Sewage and Water Charges

A combined sewage and water charge is not commonly used. Where the previous discussion of charges based on metered water implied a separate sewage charge even though it was placed on the water bill; this plan provides for only one charge to yield both water and sewage revenues. It, therefore, is not a sewage charge. The plan has no advantage except simplification of billing procedure and extreme care would have to be taken in analyzing and comparing the rates if the charges are to reflect the cost of the use and benefits provided by both works.

(c) Charges Based on Metered Water and Strength of Sewage

A charge based on metered water and the strength or characteristics of the sewage is more exact than one based on the quantity of water or sewage, particularly if the works include sewage treatment. The charge, therefore, should take into account the type of treatment and the proportion of the cost caused by the quantity and characteristics of the sewage. Such a method need not be applied to all sewage sources, but only where it is known or suspected that the concentration is especially high or low.



#### (d) Fixed Percentage of Water Bill

Sewage charges established as a fixed percentage of the water bills are perhaps the most numerous. The billing procedure is simpler and cheaper than when a separate rate structure is adopted, and the plan includes all users whether the water service is metered or not. However, such a method carries over any unfairness in water rate schedules. The charges show no fixed percentage of the water bills. The total range is from a minimum of ten per centum to a maximum of two hundred per centum with a normal range between twenty and fifty per centum, but these percentage figures have little meaning unless the water rate structure is also known.

#### (6) Quantity of Sewage

A sewage service charge based entirely on the quantity of sewage would probably most fairly measure the relative use of a sewage works, but sewage meters have not been developed which will accurately measure small quantities. Phoenix, Arizona, is the only city reporting such a rate, and it is used there only for out-of-city users who pay a rate 70¢ per 1,000 gallons. It appears that the added cost of sewage meters, meter reading, and administration would impose an excessive burden upon users.

#### b. *Summary of Plans*

The plans discussed vary widely and show great differences in charges. It is evident that in many cases the rates do not reflect the cost of construction, the cost of maintenance and operation, nor the effectiveness of the sewage works. The rates and total revenues vary so widely because they are used in so many different ways and to pay for so many different parts of the total annual cost. A few cities use such plans to finance the entire sewage works, other cities collect only enough from sewage service charges to pay the operating and maintenance expense of the sewers and the treatment works, while others collect only sufficient funds to operate and maintain the treatment plant. Still others use such funds only to pay the debt service on the treatment plant. Therefore, if some rates seem excessively high and others low in comparison, the answer likely lies in the purpose for which the rates were established. A recent report showed the following types of sewage charges in use in Indiana.<sup>4</sup>

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<sup>4</sup> *Summary of Basic Data Concerning Sewer Service Charge Structures, Municipalities in Indiana.* (Preliminary Draft 1950, Indiana Department of Health).

No. Cities Reporting	Range in Size of City Reporting in Terms of the Number of Connections
45	Maximum 33,000    Minimum 80
No. Cities	Bases of Charge
35 or 78%	Water consumption
5 or 11%	A fixed charge
5 or 11%	Number or type of connections
No. Cities	Billing Method
13	Separate billing
32	With water bill

Minimum rates ranged from \$1.32 to \$30.00 per year.

#### 4. WASHINGTON SUBURBAN SANITARY DISTRICT—WATER AND SEWAGE RATES

The Washington Suburban Sanitary District, with an area of approximately two hundred square miles and population of more than 250,000, has adopted a plan of financing the supplying of water and sewage services to large developed areas around a large city. The pertinent enabling statute gives the district wide powers. They include the authority to issue bonds without referendum, to levy taxes or special assessments, and to fix rates for the utility services.<sup>5</sup> The original act contemplated that debt service on district bonds for capital cost be met by a low tax on all property in the district plus a front-foot benefit charge on properties abutting water and sewer lines, and that maintenance and operating expenses be covered by water consumption charges applicable to all properties having connections to water pipes of the district. The act was later amended to permit the financing of supply and purification works through water rates supplementing the tax funds.<sup>6</sup> This was done in order to keep the general tax at a low level. The bonds are actually supported by an unlimited tax as ultimate security.

##### a. *Ad Valorem Tax*

The general tax rate was for many years, 7¢ per \$100 of property valuation. In 1946 this was reduced to the present 6¢ rate. In 1948 the new rate produced \$126,000. This was approximately 50¢ per capita, or 5.7 per centum of the total annual income. This sum was the only contribution by the taxpaying public to water works expense since public fire hydrant service and water for municipal uses were furnished without charge.

<sup>5</sup> Md. LAWS OF 1918, c. 122.

<sup>6</sup> There have been numerous enactments amending or supplementing the original enabling legislation. A recent statute as to water supply is Md. LAWS OF 1949, c. 537.

*b. Frontage Assessments*

The enabling act authorized the levy of front-foot benefit assessments spread over a period equal to the ultimate maturity of the bonds, originally set at fifty years, but later reduced to forty years.<sup>7</sup> The annual installments are, therefore, low.

All property is divided into four classes for front-foot benefit assessments. These are: business, subdivision, small acreage, and agricultural. It is the intention that larger frontages in the two latter classes should bear a lower rate. However, agricultural property has been exempted by legislative action, until it secures a connection to the water or sewer system, and there the assessable frontage is limited to three hundred feet.

"Business" properties carry the highest base rate, with frontage over two hundred feet bearing a lower rate. "Subdivision," "small acreage," and "agricultural" classes enjoy the same base rate, but lower than the base "business rate". The secondary rate on "subdivision" property is lower for all frontage over one hundred fifty feet. On "small acreage" a like secondary rate is applied for the first additional one hundred fifty feet, but a still lower rate is applied for all frontage exceeding three hundred feet. "Agricultural" property bears the full rate when connected, although the full frontage allowed under the law has never been assessed. These classifications may be varied from time to time as the property uses change. The following table indicates these benefit charges:

*Front-Foot Benefit Charges*

<i>Type of Property</i>	<i>Water</i>	<i>Sewer</i>
Business, first 200 feet	\$28.00	\$30.00
over 200 feet	20.00	22.00
Subdivision, first 150 feet	20.00	22.00
over 150 feet	10.00	11.00
Small Acreage, first 150 feet	20.00	22.00
next 150 feet	10.00	11.00
over 300 feet	8.00	6.00
Agricultural, if converted acreage		
150 feet	20.00	22.00

This type of charge produced an income of \$1,081,000 during the year 1948, or 45.5 per cent of the total annual revenue for that period.

*c. Water Consumption Charges*

The rate for water consumption, which remained at 22¢ per thousand gallons for many years, was increased to 27¢ on July 1, 1949. An additional annual ready-to-serve charge is also made which varies from \$2 for a 5/8 inch meter to \$4.50 for a ten-inch meter.

<sup>7</sup> MD. LAWS OF 1950, c. 92.

This type of charge produced an income of \$1,160,000 during the year 1948, or 49.2 per centum of the total annual income for that year.

d. *Application of Charges*

The following table illustrates the annual burden created by the application of these rates to three types of property:

Type 1. A property assessed at \$6,000 but not accessible to a water main or sewer.

Type 2. An undeveloped lot, assessed at \$1,000 with a 60-foot frontage on a street in which there is a water main and sewer.

Type 3. A building on a 60-foot lot assessed at \$6,000, the property using 5,000 gallons of water per month through a 5/8 inch meter.

<i>Charges</i>	<i>Properties</i>		
	<i>Type 1</i>	<i>Type 2</i>	<i>Type 3</i>
General tax (6c per \$100) .....	\$3.60	\$00.60	\$3.60
Front-foot benefit charge .....		25.20	25.20
(20¢ water, 22¢ sewer)			
Ready-to-serve charge .....			2.00
Water consumption charge .....			16.20
(27¢ per 1,000 gal.)			
<hr/>			
Total for water and sanitary sewer	\$3.60	\$25.80	\$47.00

An examination of the details of this plan indicates the following features.

1. The unusually long maturity (40 years) for bonds results in very low annual installments of front-foot benefit assessments against property.
2. Property not accessible to water mains or sewers is subject to very little annual expense.
3. Undeveloped land along a pipe line bears a larger burden, but not so large as to render it unattractive to purchasers.
4. Developed lots of ordinary size, although incurring larger payments, still pay only about four dollars per month for complete water and sewage service.

#### 5. BUFFALO SEWER AUTHORITY—SEWAGE RATES

The Buffalo Sewer Authority has jurisdiction over a sewage system serving more than 600,000 persons, both within and without the corporate limits of the City of Buffalo. The Authority deemed it unfair to base sewage service fees wholly on water use or assessed valuation of the property involved, so it established a rate struc-

ture charging both users and properties. Forty-five per cent of the income is derived from a charge for benefits to property and fifty-five per cent is derived from water use charges. The ordinance provides allowances for water which does not return to the sewers, and for water used for sprinkling. It provides special rates for difficult-to-treat wastes, and suburban users pay charges approximately double those paid by city users. The income obtained from application of this ordinance covers all capital charges, expense of operation and maintenance of the sewers and sewage treatment plant, and reserve fund requirements.

The total income for this authority was \$1,770,500 for the last fiscal year. The charge for benefits to property within the city was \$0.92056 per \$1,000 valuation, and that for property outside the city was \$1.85 per \$1,000 valuation. These charges produced \$857,000. Use charges yielded \$462,000 on 18,500 metered water accounts and \$451,500 on 80,000 flat-rate water accounts.

That the plan has worked successfully is indicated by the general approbation it has won in its twelve years of operation.

#### 6. EAST BAY MUNICIPAL UTILITY DISTRICT—SEWAGE RATES

The East Bay Municipal Utility District, which is located in an area adjacent to Oakland, California, has recently adopted a two-part rate schedule to bring in an estimated annual revenue of \$1,670,000. The rates are based on collecting 60 per cent of the total annual revenue from users and the remaining 40 per cent from property. The user's share is based on a monthly charge of \$0.35 to be paid by the occupants of individual units served by water meters having diameters of 5/8, 3/4, and 1 inches; and, in addition, a charge at the rate of 4.0 cents per 100 cubic feet (5.33 cents per thousand gallons). The property share is based on an annual charge at the rate of \$1.10 per thousand dollars of assessed valuation. The users' bill will be handled by the district and the property's bills by the county. It is intended that charges to industry for wastes which materially increase the costs of the district will be charged on a separate basis.

#### 7. IMPORTANCE OF SEWAGE RATES AND RATE STRUCTURES

The importance of the use of rates and a rate schedule for financing construction, operation and maintenance of sewage as well as water works is evidenced by the fact that at least 273 cities of more than 10,000 population have imposed sewage charges and eliminated or reduced general tax budget expenditures for sewage disposal, and the fact that sewage charge collections totaled more than \$25,000,000 during 1948 from the approximately 450 cities of all sizes then imposing such charges.

Camden, New Jersey, was the largest city to adopt these charges in 1949. The Camden rate schedule brought in more than \$227,000, although it was not in effect for the entire year. Lansing, Michigan; Portsmouth, Virginia; Joliet, Illinois; Mason City, Iowa; Morristown, Pennsylvania; and Wichita Falls, Texas, were some of the other cities which adopted the plan. The only large city which has considered and rejected the plan is Los Angeles. There it had the approval of the Mayor, the Board of Public Works and the Council's Finance Committee, but the Council turned it down. The rate schedule proposed for Los Angeles would have raised almost \$6,000,000 annually. The proposed charges ranged from 16½¢ monthly for hotel rooms to \$116.25 for commercial and industrial customers, depending on meter size.

The adoption of a sewage charge by New York, the country's largest city, commands more than ordinary interest because it is likely to accelerate a trend toward service charging, which will have a marked effect on municipal financing and sanitation progress. The mayor pointed out to the city council that the city's vast sewage disposal plan would have to be postponed if additional funds were not found through means other than the city's strained and tax-limited general obligation borrowing power. He also declared that adoption of the plan would permit the city to exclude a major portion of its sewage treatment construction costs from its debt limit computation and thus provide greater freedom to borrow for other improvements; that it would put sewage treatment on a self-sustaining basis; that it would cancel city-wide assessments for sewage treatment plans; and that it would provide funds to service existing sewer debts. The plan passed with only one dissenting vote.

The New York ordinance established a rate of about one-third of the existing water rate, or roughly 40¢ per residence per month. It also imposed charges upon commercial, industrial and other users who do not have any direct share in the cost of sewage service through real estate taxes. It is expected that the rate schedule will produce an annual revenue of approximately \$15,000,000.

## 8. CONCLUSION

Available information indicates cases where the annual revenue requirements for water and sewage works are obtained from charges against the user, on a rate schedule based entirely on water consumption; other cases where the revenues are all obtained from property in the form of taxes; still other cases where the original construction has been financed by general obligation bonds or special assessments and operation and maintenance costs have been paid

by the use of water or sewage service charges. The last plan approaches fairness in distribution between users and property, largely by coincidence rather than by design.

There is no evidence of any general practice in either the water or the sewage field to indicate that present water or sewer rates or rate structures have been fairly determined to comply with the fundamental principle that "the needed total annual revenue of a water or sewage works shall be contributed by users and non-users (or by users and properties) for whose use, need and benefit the facilities are provided approximately in proportion to the cost of providing the use and the benefits of the works."

## Recommended Procedures for Establishing Fair Rates and Rate Structures

### 1. GENERAL CONSIDERATIONS

The fundamental principle governing the determination of fair rates and rate structures for both water and sewage works has been stated in Chapter 1 as follows:

The needed total annual revenue of a water or sewage works shall be contributed by users and non-users (or by users and properties) for whose use, need and benefit the facilities of the works are provided approximately in proportion to the cost of providing the use and the benefits of the works.

The application of this principle to the determination of fair rates and rate structures for any particular situation will involve, in the first instance, the determination of the share to be borne by users and non-users, and in the second instance, an allocation between different classes of users and non-users. The general principles governing these allocations will be set forth and subsequently illustrated by actual computations indicating the results of their application under certain assumed circumstances. The proportionate allocations indicated by these illustrations will vary greatly in individual situations, and the results indicated in the illustrative cases cannot be regarded as having any general application.

In the opinion of the Joint Group, the fundamental principle stated above will usually require dual rate structures, one for users and the other for non-users. The rate schedule for that part of the needed total annual revenue to be contributed by users will ordinarily fall into usual well-known classifications. Rate schedules for that part of the needed total annual revenue to be contributed by non-users are not generally well-known, although such rate schedules have been used for some years by the Buffalo Sewer Authority for sewage works and by the Washington Suburban Sanitary Commission for both water and sewage works. Although substantial non-user contributions, in the form of regular charges represent a comparatively new and modern development, contributions by users and non-users to the original cost of installing the system or portions thereof, and contributions to the cost of servicing debts created for such construction have been collected in the past. Moreover, the amount of annual revenues to be collected from users and non-users will be affected by the extent to which such contributions have been made. The following discussion of water rates and



rate structures is directed mainly to that part of the needed total annual revenue which is contributed by users.

The word "use" means a personal, direct, positive, and routine use of the works, such as by filling and emptying a sink or tub, or by using water and discharging a waste liquor in an industrial process. Use depends on the act of a person. For use, a direct connection to the works is necessary.

The word "benefit" means that which is good for a person or thing. It is used here to supplement the word "use" so that the two words taken together will include all that is contributed by a water or sewage works to earn its needed annual revenue. As here used, it includes those indirect but substantial benefits from the operation or availability of the water or sewage works which result in the enhancement of value of adjacent and nearby property by reason of the presence of the works, even though the particular property affected may not be connected with the works. It may include such direct benefits as provision for drainage of ground water, carrying off of surface and roof water, fire protection and for street cleaning and sprinkling. In this chapter, all benefits provided by the works to property will be described by the word "benefit."

The phrase "used and useful" means that the water or sewage works are necessary to the continued existence, survival, and prosperity of the persons and property for whom they have been built and are operated, and that the works are so valid and so necessary as to justify fully, fair payments by users and non-users for their construction and operation. It is considered that the value of property is dependent to a very considerable extent on the existence and availability of the water and sewage works.

The words "rates" and "rate structures" are used and referred to often in this chapter. The intended meaning of these is defined as follows:

A rate structure is a statement, usually in tabular form, describing the rates and units to be used to compute the amount to be billed to each user and to each property benefited by the works.

The starting point in the establishment of rates is the determination of the total annual cost (sometimes referred to as the cost of service), which includes depreciation, operating costs, fair return and debt service. This discussion does not propose to deal with controversial questions involved in the determination of a fair "rate base" which will necessarily be governed by the applicable laws and decisions of the various states. It also does not deal with the various factors which govern the determination of the "rate of return" which also varies widely in different states. For the purpose of this

chapter, it is assumed that both the rate base and the fair total annual revenue have been established and accepted.

## 2. WATER RATES AND RATE STRUCTURES

As a basis for discussion and illustration the following assumptions are made:

Item	Amount for Water Works
Rate Base	\$15,000,000
Costs of Operation* .....	\$1,095,000
Depreciation** .....	150,000
Return or Debt Service or both .....	900,000
<hr/>	
Required total annual revenue. .	\$2,145,000

Although the fundamental principle governing the allocation between users and non-users is similar for both sewage and water works, its practical application to water works, under present conditions must be considered in the light of the fact that the established practice for the vast majority of private water companies has been to collect substantially all of the required annual revenues from users (municipalities paying public fire protection charges are included in the category of "users" for the purpose of this discussion). This study has revealed no legal authority for a private water works company to make any charge or assessment directly against non-users. This is also true of many publicly-owned water works. There are some publicly-owned water works where non-users contribute to the required annual revenue by reason of an annual property tax, the proceeds of which are applied to debt service requirements which are not covered by annual revenues received from users.

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\*Costs of operation include all operating and maintenance expenses and property and income taxes in the case of privately-owned companies. (The desirability of including an allowance in lieu of property or income taxes in the case of publicly-owned properties involves social and political factors which go beyond the scope of this discussion. Variations in existing practices are described in Chapter 3).

\*\*In the case of publicly-owned properties, the Joint Group is of the opinion that sound accounting practices require some provision for depreciation expense even though the funds arising therefrom may be applied to amortization of outstanding debt. (For a fuller discussion of this point see Chapter 6).

It should be noted that, as a practical matter, charges for public fire protection by water works have many of the same qualities as do charges against non-users made by sewage works. Public fire protection charges against municipalities are usually reflected by the latter in ad valorem taxes levied against owners of property without respect to use and, to the extent that they reflect the cost of fire protection for developed property and its availability for undeveloped property, may be justified on the ground that all property is benefited thereby through protection, increased value and lower fire insurance costs. Moreover, the nature of the ad valorem tax is such that consideration is given to the fact that improved property receives a greater benefit from public fire protection than vacant areas.

#### *a. Allocation Between Users and Non-users*

Although it has not been the practice to include charges against non-users (other than to the extent that they may have been reflected in public fire protection charges as noted above) with respect to the vast majority of existing water works, it is the opinion of the Joint Group that if a fair distribution of the total annual cost is to be made under the fundamental principle stated at the beginning of this chapter, consideration should be given to some method whereby non-users will contribute their fair share to the total annual cost of the benefits provided by the water works. Where non-users contribute their full, fair share to the original cost of construction of the works through assessment or otherwise, their contribution to the annual revenue, as reflected in the rates, should be reduced accordingly. Where non-users do not so contribute to the original cost, they should bear their fair proportion of the total required annual revenues.

The determination of the fair share to be allocated to users and non-users in any case involves complicated and sometimes controversial procedures. Examples showing the application of the procedures to sewage works are set forth in detail in the latter part of this chapter dealing with sewage rates and rate structures. The principles involved in these illustrations would be generally applicable to a similar determination for a water works or combined water and sewage works.

#### *b. Allocation Among Users*

The initial step in determining the proper rate structure for a water works, which raises its required annual revenue entirely from users, or for the use portion where both users and non-users are charged, is the allocation of the total cost of service or the use share between the two major types of uses—public fire protection and general service. This requires the segregation and assignment

to each class of the service costs directly attributable to that class, and the division of the remaining joint costs on some fair basis. A rate structure must then be created which will return the required annual revenues in the proper proportion from each class and, in the case of general service, that is, uses other than public fire protection, in the proper portion from the several classes of users.

*c. Principles for Allocation of Costs between Public Fire Protection and General Service*

The proper method of determining the costs of public fire protection has long been the subject of controversy. In any analysis of the proper charge, the following basic considerations should be kept in mind.

First, the quantity of water used alone does not represent a fair basis for the allocation of public fire protection costs, since it is relatively small and difficult to measure.

Second, the major portion of the cost of water is created by the necessity of being ready to serve and these costs do not vary with the quantity of water used. Since the public fire protection adds substantially to these so-called "ready-to-serve", "demand" or "capacity" costs, it should pay its proper share of them notwithstanding its small use of water.

Third, the principal ready-to-serve or capacity costs are (1) the return on investment or debt service, (2) depreciation and (3) taxes. The division of these fixed costs requires an allocation of property, since the first two are based upon the value of the works and the largest portion of the taxes of a privately-owned utility are based upon the return on investment.

In determining the cost of public fire protection, there is little difficulty in making a direct assignment of certain items, such as, fire hydrants and special fire mains. On the other hand, meters, services, purification works and small distribution mains are assignable mainly to functions other than public fire protection. Allocation of the remaining parts of the property which are used jointly is a more complex problem, however, and is the subject of considerable disagreement. The following general methods of making the allocation have been considered by various authorities dealing with this problem.

**(1) General Service as an Incremental Cost**

The cost of a system to provide fire protection alone is compared to the cost of a works to provide both functions, and the functions other than public fire protection are assigned only the incremental cost. This method, which assumes that the works were installed mainly for fire protection, seems clearly unrealistic and unfair.

## (2) Public Fire Protection as an Incremental Cost

The excess plant method is the converse of Method No. 1 and assumes that public fire protection should be charged with only the incremental cost above the cost of a plant designed to provide the functions other than public fire protection. This theory would grant a special preferential treatment to this type of service although in fact it is a necessary and equally important part of nearly all properly designed water works. Fire protection clearly requires independent consideration in the determination of the size and capacity of the transmission and distribution mains and storage facilities, and the additional cost thereof is not adequately reflected by a charge based solely on the incremental cost of fire protection. The Joint Group has discarded this method because of the discrimination and inequity which it produces.<sup>1</sup>

## (3) Capacity Ratio Method

Between the two extremes already discussed is the capacity ratio method, which in one form or other is the method most frequently given weight in current considerations of this problem. This method is based on the theory that neither general use nor fire protection is more important than the other and it, therefore, provides for the allocation of all costs of a joint nature on the basis of some relation between the capacity required for public fire protection and the capacity required for the other uses.

Under one approach to the weighing of relative capacity, commonly referred to as the proportional plant method, the allocation is worked out by estimating the cost of two plants, one to provide public fire protection and one to provide the works required for the other uses. The rate base applicable to the actual existing plant is then allocated between public fire protection and other uses on the basis of the estimated cost of the separate works which would be required for each use. The principal objection to this method is that it involves detailed estimates and studies which are based upon theoretical assumptions. In addition, the ratio thus developed has frequently been applied to all costs without first segregating those directly attributable to each type of use. Such an approach is an exaggeration of the principles behind this method.

A more flexible basis for application of this principle involves a comparison of the maximum demand for fire protection with the maximum demand for general service. As the Joint Group believes that this method provides a fair and practical procedure for making the allocation of the joint costs between fire protection and general service, it is dealt with in some detail.

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<sup>1</sup> For a new approach to this method see Ayers, *Basic Considerations in Determining Water Rates*, 42 AM. WATER WORKS ASS'N. JOURN. 981 (1950).

A number of methods are available for determining the maximum fire demand, but the Joint Group believes that the standards set by the National Board of Fire Underwriters will provide a uniform and generally reliable basis for making this computation. These standards are published by the Board<sup>2</sup> and the publication includes a list of the "required" fire flows for cities of varying populations. For example, the table of required fire flows indicates that for a city with a population of 100,000, the water system should be capable of delivering 9,000 gallons per minute over a period of ten hours. In a city of this size, the maximum demand for fire protection would, therefore, be 9,000 gallons per minute, or 540,000 gallons per hour.

For the maximum general service demand, the group suggests use of the peak hourly demand of the system during the test year. Such data should be available from the records of the water works. In addition, it is the only figure which can be fairly compared with the maximum demand for fire protection determined as noted above.

Having determined the maximum demand for public fire protection and that for general service, the allocation of joint costs to fire protection may be calculated by use of a fraction having as its numerator the maximum demand for fire protection and as its denominator the maximum demand for fire protection plus the maximum general service demand.

Although this method generally reaches a satisfactory result in communities where the water works are capable of meeting the Fire Underwriters' requirements, the method should be modified in a community where the works are clearly not up to that standard, since, otherwise, a greater proportion would be assigned to fire service than is justified by the actual capabilities of the plant. In order to allow for this possible deficiency, the Joint Group recommends the following additional adjustment to the proportions determined as indicated above. The Standard Grading Schedule contained in the above-mentioned publication of the National Board of Fire Underwriters assigns to the water supply portion of the municipal fire defense a maximum of 1700 points of deficiency. The publication also sets forth the factors which should be considered in determining the deficiency of any particular water supply. If it is found that a system has 500 deficiency points, relating to the water supply portion of its rating, its percentage of the ideal system could be expressed by the fraction  $1200/1700$ .<sup>3</sup> Applying such a fraction to

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<sup>2</sup> *Standard Schedule for Grading Cities and Towns of the United States with Reference to their Fire Defenses and Physical Conditions* (1942).

<sup>3</sup> The Joint Group recognized that for many water systems an up-to-date rating by the Fire Underwriters will not be available. However, where this is the case it is possible for the officers and employees of the water system,

the percentage determined by relative demands will produce the proper adjusted portion of joint costs assignable to fire protection. This entire computation may be expressed by the following:

$$\frac{\text{Maximum fire demand}}{\text{Maximum fire plus general demand}} \times \frac{1700 \text{ minus any deficiency points}}{1700} = \frac{\text{Portion of joint capacity costs}}{\text{allocable to fire protection}}$$

It should be understood that this adjustment is recommended only where the fire system is clearly not up to the Fire Underwriters' standard, and that where only minor deficiencies exist, particularly with regard to such matters as the appointment of employees, the efficiency of the chief executive and the adequacy of records, no adjustment should be made.

Moreover, it is not suggested that this method be used to support or create minor variations in fire protection charges between different local units served by the same water system. However, where the service provided in one local unit is substantially inferior to that in the other local units served by the same water works, then the method recommended above may provide a basis for a differential in fire protection rates.

#### d. *Classification of Costs for Determining Rate Structure*

In order to determine the joint costs which are to be allocated to fire protection by means of the percentage which has been developed, as well as to prorate the remaining costs of service fairly among the several classes of users within the general service category, it is necessary to make an analysis of all costs. This analysis requires that the costs be broken down into the following classifications:

- a. *Capacity Costs*—These costs are those incurred in order to maintain in readiness for operation a plant capable of meeting the total combined demand for all classes of service. They include all operation and maintenance expense which cannot be designated specifically as customer or production costs under b. or c. below, as well as all fixed charges, including depreciation, taxes and return.
- b. *Customer Costs*—These costs are those directly related to customers, including such items as reading meters, collection expense, customers' accounting, maintenance of meters and services, as well as other items of a similar nature.
- c. *Production Costs*—These costs are those which vary substantially or directly with the amount of water distributed, including such items as fuel, power, chemicals, pumping and purification.

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with the advice and assistance of the District Office of the National Board of Fire Underwriters, to make an analysis of the system and apply the grading schedule in accordance with the instructions contained therein.

*Note:* It is recognized that administrative and general expenses, such as officers' salaries and office rent, represent a combination of all three classes. It is recommended, therefore, that such expenses be allocated to each class in the same proportion as the total of all other expenses in each class bears to the total of all other expenses in all classes, not including fixed charges.

*e. Allocation of Costs to Public Fire Protection and Suggested Form of Rate*

As previously noted, the cost of public fire protection is essentially of a ready-to-serve or capacity nature and includes very little in the way of customer or production costs. There are, of course, certain costs which are caused solely by fire protection and these costs must be ascertained and segregated. The cost of maintenance of hydrants and the return on the investment in hydrants are the two principal examples of such direct costs.

In addition the capacity costs of a joint nature must be determined and the share of these costs to be collected from public fire protection can then be ascertained by use of the percentage obtained by means of the capacity ratio method discussed above. The determination of what costs are to be classified as capacity costs is always a problem, but the Joint Group believes that the principles embodied in the definition of capacity costs set forth above, as supplemented by the illustrative schedules attached, will permit an approximately correct determination of this matter.

Finally there should be added to the revenue to be secured from public fire protection an amount sufficient to cover the production costs of the water which it is estimated will be supplied for fire protection. An illustration of such an analysis is set forth in the attached Tables I, II and III. It should, of course, be recognized that the figures used in these schedules are for illustrative purposes only.

Frequently, the total required revenues from public fire protection are collected solely through a charge per hydrant. This method is subject to serious question since it is totally unrelated to the reasons underlying the charge, and because the high unit cost discourages the installation of hydrants on the existing system. Under ordinary circumstances the hydrant charge should be limited to an amount sufficient to recover only the expenses directly related to hydrants, and that the balance of the public fire protection charges be apportioned on a lineal basis over the distribution mains available for such service. This results in a relatively low hydrant charge, thus encouraging hydrant installation, and a lineal charge having a direct relationship to the service furnished.



The Joint Group recognizes that in some situations this type of charge may have to be modified. For example, in sparsely settled areas it may operate unfairly where new extensions require long lines providing little or no fire protection.

*f. General Service Rate Structure*

After the costs to be recovered from public fire protection have been ascertained, there remains the problem of establishing a rate schedule for users in the general service category which will permit the most equitable recovery of those costs which remain. This has generally been accomplished through rate schedules containing a ready-to-serve or minimum charge and three or more quantity blocks. As a rule, the customer costs and some portion of the capacity costs are included in the ready-to-serve or minimum charge, while production costs and the remaining capacity costs are collected through the quantity charges.

The Joint Group approves a two-part rate of this type. Moreover, there is general agreement regarding the justice of collecting the customer costs through the ready-to-serve or minimum charge on a per customer basis and the production costs through the quantity charges on a per gallon of use basis. The chief difficulty in applying this principle arises from (1) the determination of the portion of the capacity costs which should be collected through the ready-to-serve or minimum charge, and (2) the division thereof between the various customers. In the past the assumption has been generally accepted that all capacity costs, determined as heretofore indicated, should be collected on the basis of the maximum demand which each customer can place upon the system. This assumption has been of little value, however, since no proper method exists in the water industry for measuring the maximum demand of each customer. The type of meter in general use indicates quantity of water consumed and it is some indication of potential demand, but it does not show the actual maximum or peak demand during any particular hourly or daily period.

Aside from this weakness, however, the Joint Group believes that the basic assumption itself is erroneous. Certain of the capacity costs are, of course, caused by the demand factor. However, another portion of these capacity costs, that is, the fixed charges, is very definitely influenced by the total use of water which is made by all of the customers. For example, the return or debt service portion of the fixed charges is based largely upon the actual property installed, yet the capacity of a substantial portion of this property is governed by estimates as to the total use which will be made of the facilities and not by the demand on those facilities at any particular moment. In addition, it can be argued that the capacity

constructed for general service is installed primarily for use and the total use of each customer should therefore at least partly control the share which he should pay of the cost of that capacity.

In the light of these facts, it is the opinion of the Joint Group that the return or debt service element of the fixed charges is affected by use as well as by demand. Since the other two fixed costs, taxes and depreciation, are so closely related to the property in service and the income from that property, it is the conclusion of the Group that they are subject to a similar treatment. Although the relative importance of demand and use cannot be measured with scientific accuracy, it is the consensus of the Group that they are approximately equal. Based upon this conclusion the Joint Group recommends that one-half of the fixed charges (remaining after the allocation to fire protection) be collected through the use or commodity blocks of the schedule and that only the remaining fixed costs and other capacity costs be collected in the minimum or ready-to-serve portion of the rate schedule. For the application of this principle, see Table IV.

To complete the determination of the portion of these costs which each customer should bear, the division within the ready-to-serve or minimum part of the rate schedule must still be made. As previously noted, meter size is not an accurate measure of the maximum demand of each customer and therefore not a completely satisfactory basis for division of the ready-to-serve or minimum charges.<sup>4</sup> It is believed, however, that by reason of the division of fixed costs recommended, the capacity costs remaining to be collected in this portion of the schedule do reflect, to a reasonable extent, the potential demand which each customer can place upon the system by reason of the size of his meter and that the use of meter size as a basis for allocation of these remaining costs will, therefore, not result in any serious inequity. The continued use of this method of division is, accordingly, approved by the Joint Group.

There remains the problem of establishing the three or more blocks of the output charge. As previously indicated the operating expenses which are classified as production costs should be divided on a per gallon basis and the different blocks will, therefore, be created by the division which is made of the fixed charges which

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<sup>4</sup> To avoid this difficulty the American Water Works Association's Committee on Water Rates has recommended a relatively new type of rate structure which can be established without determining what the capacity costs are or how they should be divided. The Joint Group believes that for relatively small communities which are publicly-owned and are operated on a cash basis, this proposal of the American Water Works Association has considerable merit. The Joint Group does not believe that the proposal is satisfactory for larger communities having more diverse demand factors and it is for this reason that the Group has maintained the two-part type of rate structure.

are to be collected in this portion of the rate schedule. Actually it would appear that the greater portion of them are caused by the large and varied demand which is placed upon the system by the domestic customer and, to a lesser extent, by the commercial customer. It is this group which makes necessary the large expenditures for distribution mains and it is generally this group which creates the need for local storage and for extensive sources of supply. The domestic sprinkling load during the relatively dry summer months is unquestionably one of the largest contributors to the fixed costs connected with the supply facilities.

For the reasons indicated above, the Joint Group feels that the major portion of these fixed charges should be collected in the first block of the output rate, with a diminishing quantity of these fixed charges being collected in the subsequent blocks. The actual division must be determined separately in each case and no fixed rules can be established. The same is true with regard to the quantity limitations for each block.

The Committee on Water Rates of the Michigan Section of the American Water Works Association suggested in a 1948 report that the first block include a quantity of water equal to twice the average consumption through all meters 5/8" to 3/4" in size.<sup>5</sup> The second block would be applied to a quantity equal to twice the average consumption through meters 1" to 4" in size and the third block to all quantities consumed in excess of that amount. The Joint Group believes that such a division would provide a suitable guide for the establishment of the quantity limitations in each block, it being understood, of course, that adjustments would have to be made in order to insure that these quantity brackets when used in conjunction with the output charges developed would produce the necessary revenue requirements.

In all instances requiring the development of a rate schedule, a consumer analysis should be made to determine the actual consumption of water by accounts. This analysis is essential as a guide in establishing the quantities for the various blocks and as a means of determining the proper proportioning of demand costs between a ready-to-serve or minimum charge and the succeeding blocks. Of course, it is only through such an analysis that the total revenues under any contemplated schedule can be estimated with any degree of accuracy.

Within the framework of the foregoing general principles, considerable latitude is necessary in order to meet varying local conditions and practical considerations. One such may be a local regulation, or public prejudice, which prevents or makes imprac-

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<sup>5</sup> *Proposed Water Rate Schedule*, 41 AM. WATER WORKS ASSN. JOURN. 209 (1949).

tical the use of a ready-to-serve charge. In that case, a minimum charge may be used in which there may be combined the customer costs, the capacity costs, and the first quantity charge for the amount of water allowed under the minimum. The quantity allowed must be such as neither to encourage waste nor put an undue burden upon the customer with a relatively small demand.<sup>6</sup>

Special consideration must sometimes be given to particular classes of customers who are of benefit to the water works, but who for one reason or another should not be treated on the same basis as the majority of the customers. For example, distance factors and high pressure zones frequently require special treatment and where the additional cost caused by these factors is substantial and measurable, the users involved should pay for that cost. In such cases, classification and special ready-to-serve, minimum or quantity charges may be included in the rate schedule.

In addition, there are other special types of customers, such as golf courses, summer residents, and seasonal users of air conditioning equipment, who have extremely poor load factors, and who should pay the full capacity costs attendant upon the capacity to serve them only seasonably. Fixed charges based upon meter size do not adequately solve the problem created by this group as such a method does not take into consideration the load factor which is so important in the economic operation of the water plant. If a satisfactory demand meter was available to the water supply industry, charges reflecting the load factor could be made in the water industry as they are in the power industry.<sup>7</sup> The Joint Group favors any progress which can be made in this direction. In the absence of such a meter, it is suggested that special rates be established to apply to these users with the low load factors. Such rates should be designed to encourage the conservation of water by this group and to make them contribute their proper share of the revenue requirements of the utility.

### 3. SEWAGE RATES AND RATE STRUCTURES

As stated at the outset of this chapter, the fundamental principle governing the allocation of the needed total annual revenue between users and non-users, applies to both water and sewage works. A procedure or technique for the application of the principle to a sewage works and for computing the rates and rate structures is described and illustrated in the following paragraphs.

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<sup>6</sup> The Joint Group also recommends that any rate schedule be expressed in gallons rather than in cubic feet.

<sup>7</sup> A full discussion of the desirability of establishing new rates embodying the foregoing principle is set forth in a Committee Report presented at the annual conference of the American Water Works Association on May 26, 1950, by a Sub-committee on Water Use in Air Conditioning and Refrigeration.

The procedure described is not intended to be rigid or final. The differences in local conditions and objectives are so important that a currently recommended procedure should be sufficiently flexible to permit its use, without violence to the fundamental principle, to a wide variety of circumstances. It is to be expected, moreover, that with increased use over the years, the suggested procedure will be adjusted and improved. It is confidently asserted, at the same time, that the fundamental principle and the procedure and technique recommended for its application are so reasonable and fair as fully to merit support and approval by courts and commissions.

The procedure comprises a computation of the parts of the needed total annual revenue or cost which are caused on the one hand by users and on the other hand by non-users of properties.

The procedure and technique for computing fair rates and rate structures are based on the assumption that the fair value of the works and the fair total annual revenue have been established and accepted. These two subjects, as they affect fair rates and rate structures, are discussed in other chapters of the report. The following tabulation presents these elements as assumed for purposes of illustrative computations.

Item	Amount for Sewage Works
Fair Value of the Works .....	\$17,500,000
Accepted Total Annual Revenue	
Operation .....	850,000
Fixed Charges, Comprising Deprecia- tion, Fair Return or Debt Service..	962,500
	<hr/>
	\$ 1,812,500

While these amounts are much simplified and are employed only for illustration, they are approximately the same as those in the financial statements of an actual utility. The value of the works may be the actual costs of record, the estimated cost or the fair value, if that has been determined and accepted.

The basic procedure is to determine the portion or part of the fair value and then of the total annual cost of each major part or function of the works, which is attributable to users, on the one hand, and non-users or properties, on the other. This is a direct application of the fundamental principle that the needed total annual revenue shall be contributed by users and non-users in proportion to the cost of providing for the use made by users and for the benefits received by non-users. Tables V to VIII, which appear at the end of this chapter, illustrate the computation.

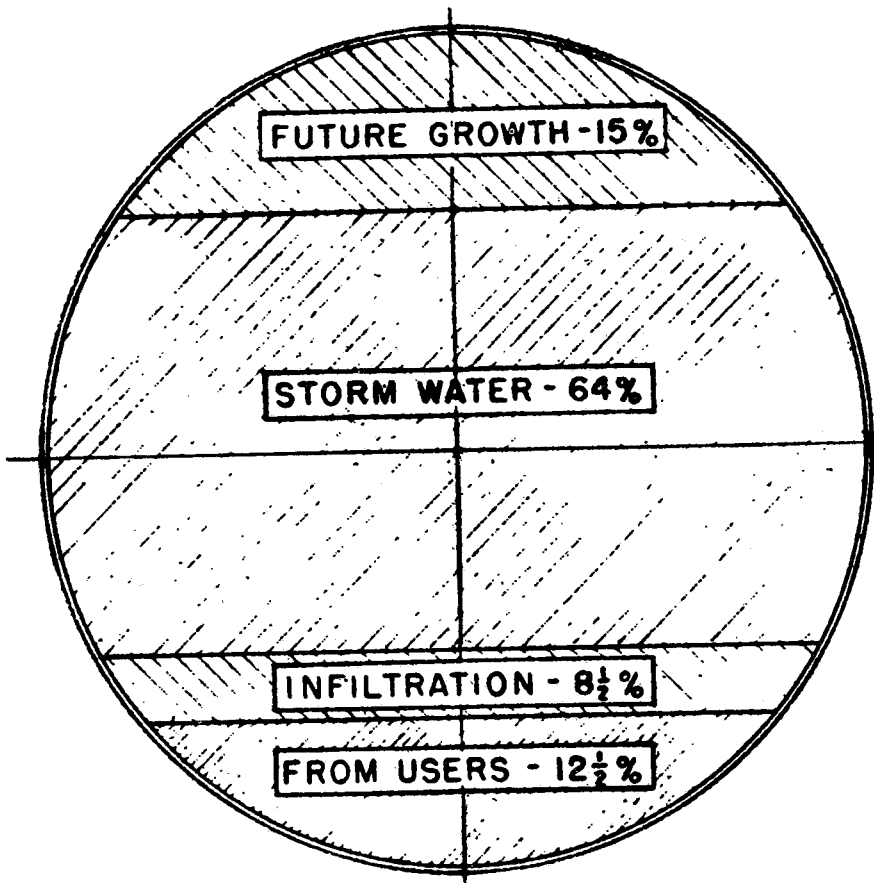
The object of the computation is to determine the allocation of the annual amounts on which the rates and rate structure will be based. Thus, one part of the needed total annual revenue of \$1,812,500 will be found to be the fair share of users, and the rates for computing individual bills to users will be set to yield this amount. The other part will be the fair share to be contributed by non-users, and charges to property will be set to yield this amount.

The first step is to prepare a descriptive list of each major part of the works, and the second step is to determine the fair value of each part.

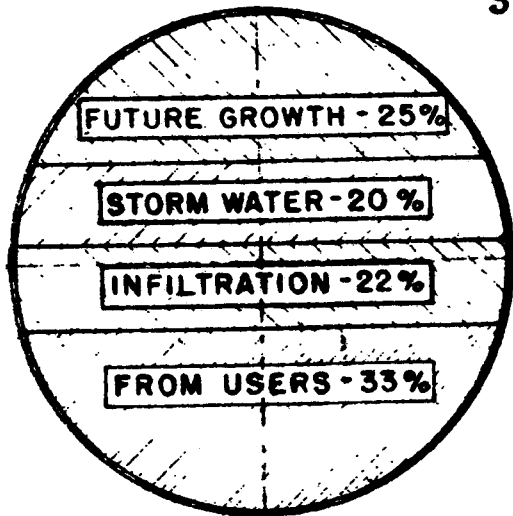
The third step is to divide the amount representing the cost of each major part of the works into an amount attributable to use and another attributable to benefits to property. In this procedure account must be taken of the effect of the source, quantity and character of the sewage on the value and on the annual cost of each major part or function of the works. Thus, the cost of sludge disposal facilities is caused mainly by the suspended solids discharged to the works by users and should, therefore, be allocated mainly to use. The size and cost of collecting and intercepting sewers, on the other hand, are caused wholly by the quantity of sewage. Their cost can, thus, be allocated to use and to property in proportion to the quantity of sewage each discharges or contributes to the works. An example of such a division for an intercepting sewer system serving a combined system of collecting sewers, is shown on Figure 1 and is summarized as follows:

Item	Per Cent of Capacity of Sewer
<i>Use</i>	
Actual quantity from users .....	33.0
<i>All Property</i>	
Infiltration .....	22.0
Storm water .....	20.0
<i>Vacant or Undeveloped Property</i>	
Allowance for future growth .....	25.0
Total .....	100.0

In this illustration, 33 per cent of the accepted fair value or construction cost of intercepting sewers is caused by users and should be paid for by them. This percentage would be applied to the estimated debt service for sewers. The remainder should be paid for by properties. In each case, when the fair value has been distributed, the resulting allocations to users and to non-users are an adequate and fair basis for computing the fair share of the fixed charges to be contributed by each group.



COMBINED  
SEWERS



INTERCEPTING  
SEWERS

ILLUSTRATIVE  
ALLOCATION OF CAPACITY  
IN COMBINED SEWERS  
AND  
INTERCEPTING SEWERS

The total annual amounts allocated to users and to non-users should be arranged into rate schedules so that the several classes of users and non-users will each contribute a fair amount. For instance, it will appear that developed and undeveloped properties have different effects on the annual expenditure which should be reflected in the rate schedule.

Table V illustrates the computation of the fair shares of the value attributable to users and to properties. The major parts or functions are shown in Column (1), and the cost of each in Column (2). These parts should be in sufficient number to permit a reliable computation; the number will be the product of experience and judgment. The amounts of fair value should be determined on the basis of accounts and estimates in accordance with an approved method of computing a rate base.

The percentage of the fair value of each major part or function caused by use and by property is shown in Columns (3) and (4). These percentages are determined in accordance with the effect of the quantity and the characteristics of the sewage on the fair value of each major part or function. In general, the quantity element will be determined by looking to the source of the quantities of sewage as shown above. The effect of the characteristics of the sewage will depend upon the kind of sewage works and, in the works illustrated, will depend largely on grit, screenings, suspended solids and chlorine demand. In some sewage works, the biochemical oxygen demand (B. O. D.) will be an important factor, especially where biological treatment is used.

In the division shown above, the quantity of sewage from users is 33 per cent of the total capacity of intercepting sewers. The percentage in the case of collecting sewers may be smaller, depending on the amount of storm water for which capacity is provided. In Column (3) of Table V, the illustrative percentage is 12.5, as shown for combined sewers in Figure I. In this case the division is illustrated as follows:

Item	Per Cent of Capacity of Combined Collecting Sewers	
<i>Use</i>		
Actual maximum quantity from users .....	12.5	
<i>All Property</i>		
Infiltration .....	8.5	
Storm water .....	64.0	
<i>Vacant or Undeveloped Property</i>		
Allowance for future growth .....	15.0	87.5
Total .....	100.0	



This tabulation illustrates the difference in effect on the cost of collecting sewers, of developed and undeveloped property which should be recognized in a rate schedule. Thus, the 87.5 per cent allocated to properties would be divided by allotting 72.5 per cent of the total to all property and 15 per cent to vacant or undeveloped property. The last percentage represents the allowance for future growth. To apply such differences it will be necessary to have some yardstick such as the assessed valuation for the two classes of property.

The foregoing illustration employs a combined sewer system carrying both sanitary sewage and storm water.<sup>8</sup> If the collecting sewers are on the separate plan and rates are being computed for sewers carrying only small quantities of storm water, the percentage of the cost caused by use will be considerably higher than in the illustration.

For other parts of the sewage works, as shown in the table on page 252, about 62.5 per cent of the property share would be allocated to all property and about 37.5 per cent of the property share to undeveloped property.

For intercepting sewers, the main or longest line is estimated to follow the general division shown on page 252. For branch lines, in the case illustrated, the allocation to use is somewhat higher; and for the river crossing in the illustration, an intermediate percentage for use is estimated because of the moderating effect of the two sewers joining together. The result is a percentage of 65 to property.

The fair value of each pumping station is broken down as between structure and equipment. The structures provide for a longer future than the equipment, and therefore the allocation to property is proportionately larger for the structures than for the equipment. Otherwise, the percentages are based mainly on quantities with due regard for that part of the cost of screens and screenings disposal facilities caused by use and by storm water; and to the wearing of pump parts by grit in storm water.

In the treatment plant, the percentages caused by use and by property depend on both the quantity and the characteristics of the sewage. A study of the costs of various parts of each major part or function is required. Thus, the cost of screens and grit tanks is attributable mainly to grit and storm water from property. On the other hand, the cost of sludge disposal facilities is caused largely by users. In Table V, the percentage covered by use is 85. Fifteen percent is allocated to property because some grit or sand from storm water accumulates in the sludge tanks which requires the emptying and cleaning of these tanks at infrequent intervals.

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<sup>8</sup> See c. 2, Chart II.

In a similar manner, the cost of each major part or function should be analyzed and the parts of the cost caused by use and by property determined. The results of such an analysis are shown in Table V. They are summarized as follows:

Item	Allocation of Fair Value	
	Per Cent	Amount
Use .....	31.8	\$ 5,578,150
Property .....	68.2	11,921,850
Total .....	100.0	\$17,500,000

These allocations are used only in computing the shares of the annual fixed charges to be contributed by users and by properties. Fixed charges include such items as depreciation, fair return and debt service. In the illustrative computations, these fixed charges have been taken at 5.5 per cent of the fair value.

Table VI illustrates the computation of the fair shares of the total annual cost to be contributed by users and by properties. The major parts or functions are the same as in Table V. The annual cost of operating each major part is shown in Column (2). These amounts should make up the total annual expenditure, exclusive of fixed charges, and should include labor, power, supplies, maintenance, repairs and other operating items.

The percentage of the annual cost of operation of each major part caused by use and caused by property is shown in Columns (3) and (4). These percentages are determined in accordance with the effect of the quantity and characteristics of the sewage in the same manner as described above for computing percentages of the fair value.

The percentages used to allocate the annual cost of administration in Table VI are the weighted average percentages of the major parts. An allocation to each major part from the accounts of the utility would be preferred, if available. The percentages used to allocate the fixed charges are taken from Table V.

The results of the computation are summarized as follows:

Item	Allocation of Total Annual Cost	
	Per Cent	Amount
Use .....	45.2	\$ 819,010
Property .....	54.8	993,490
Total ... ..	100.0	\$1,812,500

If it be decided that a small part of the total annual cost, such

as five percent, should be considered general public benefit and contributed by the public corporation, it should be taken, pro-rata, from the amounts assigned to users and to properties, and these amounts should be reduced accordingly.

The next step is a computation of a fair distribution of the use share (\$819,010) to each user or group of users. The two principal classes of users are (a) residential and commercial and (b) industrial. The fair part of the use share which each should contribute depends upon the percentage or the amount of the use share which is caused by the quantity and by the characteristics of the sewage, including the suspended solids, the chlorine demand and where biological treatment is used, the B. O. D.

The computation involves a division of the users' share, first of the fair value and second of the total annual cost, into amounts caused by each of the foregoing items. These computations are shown in Tables VII and VIII for a sewage works having no biological treatment. The allocation of the fair value is made to determine the allocation of the fixed charges. All of the fair value of the collecting sewers is considered to be caused by and hence chargeable to quantity. Of the operating cost of collecting sewers (Table VIII) 50 per cent is estimated to be caused by the quantity of sewage, and 50 per cent by the suspended solids.

For both the capital and the operating cost of sludge disposal facilities, 100 percent is estimated to be caused by the suspended solids; and, in both cases, 100 per cent of the chlorinating plant costs are caused by the chlorine demand.

The computations made in Tables VII and VIII are summarized as follows:

Item	Part of Share of Total Annual Cost for Use	
	Per Cent	Amount
Sewage Quantity .....	43.3	\$354,240
Suspended Solids .....	45.9	376,130
Chlorine Demand .....	10.8	88,640
Total .....	100.0	\$819,010

The average unit rates for use can now be computed by dividing the foregoing divisions of the use share of the total annual cost by the annual quantities of each item, which, in the illustrative works, are as follows:

Item	Annual Quantity
Sewage in 1000's of gallons .....	50,000,000
Suspended Solids in 100's of pounds ...	845,000
Chlorine Demand in 100's of pounds ..	20,000

As the part or amount of the use share caused by quantity has been estimated to be \$354,240, this amount, divided by 50,000,000 M (thousands) of gallons of sewage per year, gives the average rate per 1000 gallons to be charged users for the quantity of sewage which they require the works to handle. The average rates are summarized as follows:

Unit	Rate in Cents per Unit
1,000 or M gallons of sewage	$\frac{35,424,000\text{¢}}{50,000,000} = 0.71\text{¢}/1,000 \text{ gal.}$
100 pounds of Suspended Solids	$\frac{37,613,000\text{¢}}{845,000} = 44.5\text{¢}/100 \text{ lb.}$
100 pounds of Chlorine Demand	$\frac{8,864,000\text{¢}}{20,000} = 443\text{¢}/100 \text{ lb.}$

The rates for property can be based on assessed valuation, area or frontage of different kinds of property, or on some other property yardstick. For instance, if the assessed valuation of all property is \$1,000,000,000, the unit rate or charge is \$0.9935 (\$1.00 in round figures) per \$1,000 of assessed value.

If the amount allotted to non-users or properties is subdivided into the amount caused by developed and that caused by undeveloped property and the local tax records show the assessed valuation of the two classes of property, then two rates can be established. This may be illustrated as follows:

Item	Amounts
a. Assumed assessed valuation	
All property .....	\$1,000,000,000
Vacant or undeveloped property ..	250,000,000
b. Assumed portion of amount allocated to property caused by	
All property .....	632,370
Vacant or undeveloped property ..	361,120
Total .....	\$993,490
c. Resulting average rates or charges to property per \$1,000 of assessed valuation	
All property .....	\$0.63
Vacant or undeveloped property ....	1.44

The amount paid annually by different kinds of property can be computed from the foregoing. Thus, a developed lot having an assessed valuation of \$15,000 would pay as a property charge, \$9.30 per year and in addition a use charge of, say, \$3.50 per year, a total of \$12.80.

A vacant or undeveloped lot having an assessed valuation of \$2,500 would pay \$5.15 per year as a property charge.

After the average rates for use and for benefits to property have been computed, as described above, the next step is the arrangement of these two average rates into rate structures. The rate or charge for use is often computed and billed on the basis of the metered quantity of water. If a fair rate structure for water used or consumed is in effect, the rates and the rate structure for sewage may be computed as a percentage of the metered water bill. Otherwise a rate structure for sewage should be established. In doing this, it is suggested that consideration be given the so-called demand and commodity elements of the things provided by the works. Based on all of the foregoing, a computation of an average rate for use, is illustrated as follows:

Assume a family of four contributing 125 gallons of sewage per person, per 24 hours, a total of 500 gallons.

The annual quantity is  $500 \times 365$  or 182,000 gallons.

Assume that collections will be 95 per cent of the amount billed. The average rate of .71¢ per 1,000 gallons of sewage will then be increased to .75¢ per 1,000 gallons of sewage. The annual payment by the family, based on this quantity, will be  $182.5 \times .75c$  or \$1.37.

Assume that each member of the family contributes .2 pounds of suspended solids and .01 pounds of chlorine demand, per 24 hours. Then the annual charge or contribution of the family for these characteristics may be computed as follows:

#### Suspended solids

$4 \times .2 \times 365 = 298$  pounds per year

292 pounds @ 44.5¢ per 100 times  $1/.95 = \$1.37$  per year

#### Chlorine demand

$4 \times .01 \times 365 = 15$  pounds per year

15 pounds @ \$4.43 per 100 times  $1/.95 = \$7.0$  per year

The annual payment by the family will be the sum of the foregoing as follows:

Item	Annual Amount
Quantity .....	\$1.37
Suspended solids .....	1.37
Chlorine demand.....	.70

---

Total.....\$3.44

In the foregoing, a single charge for family use is based on the metered quantity of water. For industries or others contributing appreciably different concentrations of suspended solids and of chlorine demand (or other characteristics), the characteristics of the particular sewage should be determined from time to time and the charge or bill computed for each sewage characteristic, the sum being the amount to be paid.

#### 4. SUMMARY

In this chapter a recommended procedure for applying the fundamental principle is outlined. Essentially, the procedure is a computation of the cost of providing the benefits to non-users or properties, and the use of the works. Each major part or function of the works is studied to ascertain what part of its total annual cost is caused by users and what part by non-users. The average rate or charge is readily computed after obtaining the fair total amount to be contributed by users and non-users and by dividing the total number of use units and of non-use units into these amounts. Such units may be gallons in the case of use and dollars of assessed valuation, or feet of frontage for non-use. This is the more or less obvious idea described in Chapter 1.

The average rates or charges obtained in accordance with this recommended procedure, or by some other, must then be arranged into rate schedules for users and for non-users. A method for establishing such schedules has been described. The essential fairness of the rates and of the rate structures depends, it is suggested, more upon the fair division of the needed total annual revenue than upon the arrangement of these amounts into rate structures.

It seems obvious, also, that in water works a contribution should be made by those benefited by the fire protection provided by the works. The amount so contributed should be in proportion to the cost of providing this benefit. This, of course, creates a problem which has been the subject of considerable study and discussion and areas of disagreement still remain. However, it seems obvious, in the opinion of the Joint Group, that in the past, the amount contributed for fire protection has generally been considerably below the cost of providing the service, and with that in mind, a procedure for computing the share of the total annual cost caused by fire protection has been recommended.

**TABLE I**  
**Illustrative Allocation of Fixed Costs**

Item	Total Rate Base	Direct To Fire	Direct to General Service	Joint
<b>ALLOCATION OF PROPERTY</b>				
100.1 <i>Utility Plant in Service</i>				
301 Organization — Estimated	10,000			10,000
311 <i>Land and Land Rights</i>				
311.11 Water Rights	15,000			15,000
311.12 Reservoir Land	250,000			250,000
311.13 Other Source of Supply Land	10,000			10,000
311.2 Power and Pumping Land	25,000			25,000
311.4 Transmission and Distribution	200,000			200,000
311.62 Stores, Shop and Garage Land	50,000			50,000
312 <i>Structures and Improvements</i>				
312.11 Collecting and Impounding Reservoirs	1,500,000			1,500,000
312.12 Lake, River & Other Intakes	300,000			300,000
312.2 Power and Pumping Structures	2,250,000			2,250,000
312.3 Purification Buildings	750,000		750,000	
312.62 Stores, Shop & Garage Buildings	250,000			250,000
312.63 Misc. Structures & Improve- ments	100,000			100,000
316 Electric Pumping Equipment	300,000			300,000
320 Purification System	890,000		890,000	
321 Laboratory Equipment	100,000		100,000	
322 Mains and Accessories	5,500,000		500,000*	5,000,000
323 Services	500,000		500,000	
324 Meters	250,000		250,000	
325 Fire Hydrants	250,000	250,000		
328 Office Furniture & Equipment	150,000			150,000
329 Transportation Equipment	350,000			350,000
331 Shop Equipment	250,000			250,000
332 Tools & Work Equipment	500,000			500,000
334 Miscellaneous Equipment	250,000			250,000
<b>TOTAL</b>	<b>15,000,000</b>	<b>250,000</b>	<b>2,990,000</b>	<b>11,760,000</b>
Percentage of Total Property	100%	1.7xx	19.9xx	78.4xx
<b>ALLOCATION OF FIXED CHARGES</b>				
Return	900,000	15,300	179,100	705,600
Depreciation	150,000	2,550	29,850	117,600
Taxes	225,000	3,825	44,775	176,400
<b>TOTAL FIXED COSTS</b>	<b>\$1,275,000</b>	<b>\$21,675</b>	<b>\$ 253,725</b>	<b>\$ 999,600</b>

\* Mains under 6" not used for fire protection.

xx These percentages have been applied to Depreciation and Taxes as well as Return on the theory that each is related to the percentage of property allocated to each type of service. For greater accuracy taxes could be more closely analyzed since only income and property taxes are closely allied to property and return.

**TABLE II**  
**Illustrative Allocation of Total Cost of Service**

Operating Expenses	Total Costs	Direct to Fire Service	Joint Capacity Costs	Capacity	Direct to General Service	
					Customer	Production
<b>Source of Supply Expenses</b>						
Labor and Expense .....	\$ 6,900					300
Maintenance .....	600					
<b>Power and Pumping Expenses</b>						
Labor .....	117,000		\$ 6,900			117,000
Power .....	180,000		300(A)			180,000
Miscellaneous .....	5,000					5,000
Maintenance .....	49,000					24,500
<b>Purification Expenses</b>						
Labor .....	43,000		24,500(A)			43,000
Chemicals .....	100,000					100,000
Miscellaneous .....	1,000					1,000
Maintenance .....	10,500					5,250
<b>Transmission and Distribution Expenses</b>						
Labor .....	35,000		5,250(A)			
Miscellaneous .....	8,000					
Maintenance .....	55,000			(B)		27,500
Hydrants — Operating and Maintenance .....	6,000					
Meters — Operating and Maintenance .....	17,000				17,000	
Services — Operating and Maintenance .....	23,000				23,000	
Cust. Accounting and Collecting Expenses .....	75,000				75,000	
Salaries and Wages and Expenses .....						
Sales Promotion Expenses .....	8,000				8,000	
Expenses and Supplies .....						
Sub-Total .....	740,000	6,000(0.8%)	107,450(14.5%)		123,000(16.6)	503,550(68.4)
Administrative and General Expenses .....	130,000	1,040(C)	18,850(C)		21,580(C)	88,530(C)
<b>TOTAL OPERATING EXPENSES</b> .....	\$ 870,000	\$ 7,040	\$ 126,300		\$ 144,580	\$ 592,080
<b>Fixed Charges (Table I)</b> .....	1,275,000					
Direct to Fire .....		21,675				
Direct to General Service .....				253,725		
Remainder .....						
<b>TOTAL FIXED CHARGES</b> .....	\$ 1,275,000	\$ 21,675	\$ 999,600		\$ 253,725	\$
<b>TOTAL COST OF SERVICE</b> .....	\$ 2,145,000	\$ 28,715	\$ 1,125,900		\$ 253,725	\$ 592,080

(A) For simplicity these Maintenance Expenses have been divided equally between Capacity and Production Costs. Actually the portion of these expenses incurred without regard to output will vary and actual experience in any specific water works may dictate a different division.

(B) For simplicity it has been assumed that there is no maintenance on the small mains not used for fire protection service.

(C) Administrative and General Expenses are allocated in the same proportion as the total of all other expenses in each column bears to the total of all other operating expenses.



TABLE III

## Summary of Illustrative Allocation

*Fire Protection Service*

Costs allocated directly to Fire .....	\$ 28,715.
Joint Capacity Costs x 20%* .....	225,180.
Production Cost of Estimated Amount of Water for Fire .....	5,000.
<b>TOTAL FIRE PROTECTION CHARGE .....</b>	<b>\$258,895.</b>

Remaining Joint Capacity Costs .....	\$900,720.
Capacity Costs allocated directly to General Service .....	253,725.
Total Capacity Costs Allocated to General Service .....	1,154,445.
Customer Costs .....	144,580.
Production Costs .....	587,080.
<b>TOTAL CHARGE GENERAL SERVICE .....</b>	<b>\$1,886,105.</b>

\* It is assumed that this plant has a peak hourly demand of 2,160,000 gallons per hour and is located in a city having a population of 100,000. The required fire flow is, therefore, 9,000 gpm, or 540,000 gph and analysis of the plant has shown that it has significant deficiency requiring an adjustment. The percentage is determined as follows:

$$\frac{540,000}{540,000 + 2,160,000} = \frac{540,000}{2,700,000} = 20\%$$

TABLE IV

## Illustrative Division of Costs Allocated to General Service

	Minimum or Ready-to-Serve Charge	Output Charge
Customer Costs .....	\$144,580(A)	
Fixed Costs Assigned to General Service [\$253,725] .....	126,862(B)	\$ 126,862(D)
Joint Capacity Costs — Operating Expenses \$126,300 x 80% .....	101,040(B)	
Joint Capacity Costs — Fixed Charges \$999,600 x 80% = \$799,680 .....	399,840(B)	399,840(D)
Production Costs .....		587,080(C)
<b>Totals .....</b>	<b>\$772,322(E)</b>	<b>\$1,113,782</b>

(A) Divided on a per customer basis.

(B) Divided on basis of meter size.

(C) Divided on a per gallon basis throughout all output charges.

(D) Apportioned among the various blocks and then divided on a per gallon basis.

(E) If minimum type charge is used then it should include the cost of the water allowed as determined by the charge in the first block of the output portion of the schedule.

**TABLE V**  
**Illustrative Computation of the Allocation of the Total Cost or Fair Value to Use and Property**

(1) Major Part or Function	(2) Total Fair Value	(3) Per Cent of Total Caused By		(4) Amount of Fair Value Caused By		(6) Property
		Use	Property	Use	Property	
Collecting Sewers, Combined .....	\$ 6,300,000	12.5	87.5	\$ 790,000	\$ 5,510,000	
Intercepting Sewers						
Main Line .....	4,000,000	33.0	67.0	1,320,000	2,680,000	
North Branch .....	2,200,000	38.0	62.0	836,000	1,364,000	
River Crossing .....	300,000	35.0	65.0	105,000	195,000	
Pumping Stations						
North Branch — Structure .....	185,000	28.5	71.5	53,000	132,000	
— Equipment .....	65,000	37.0	63.0	24,000	41,000	
District No. 1						
— Structure .....	40,000	23.8	76.2	9,500	30,500	
— Equipment .....	10,000	31.5	68.5	3,150	6,850	
Main Station — Structure .....	700,000	23.8	76.2	166,000	534,000	
— Equipment .....	300,000	31.5	68.5	94,500	205,500	
Treatment Plant						
Screens and Grit Tanks .....	420,000	15.0	85.0	63,000	357,000	
Sedimentation Tanks .....	800,000	57.0	43.0	455,000	345,000	
Sludge Tanks .....	400,000	85.0	15.0	340,000	60,000	
Sludge Disposal Plant .....	630,000	85.0	15.0	535,000	95,000	
Main Building .....	650,000	76.0	24.0	494,000	156,000	
Chlorinating Plant .....	100,000	76.0	24.0	76,000	24,000	
Outfall .....	200,000	50.0	50.0	100,000	100,000	
Roads and Grounds .....	200,000	57.0	43.0	114,000	86,000	
	<u>\$17,500,000</u>	<u>31.8</u>	<u>68.2</u>	<u>\$5,578,150</u>	<u>\$11,921,850</u>	

**TABLE VI**  
**Illustrative Computation of the Allocation of the Total Annual Cost to Use and Property**

(1) Major Part or Function	(2) Annual Cost of Operation	(3) Per Cent of Total Caused By		(4) Amount of Total Annual Cost Caused By		(6) Property
		Use	Property	Use	Property	
Collecting Sewers, Combined .....	\$ 260,000	40.0	60.0	\$104,000	\$156,000	
Intercepting Sewers .....						
Main Line .....	20,000	40.0	60.0	8,000	12,000	
North Branch .....	10,000	44.0	56.0	4,400	5,600	
River Crossing .....	5,000	42.0	58.0	2,100	2,900	
Pumping Stations .....						
North Branch .....	30,000	40.0	60.0	12,000	18,000	
District No. 1 .....	15,000	44.0	56.0	6,600	8,400	
Main Station .....	50,000	42.0	58.0	21,000	29,000	
Treatment Plant .....						
Screens and Grit Tanks .....	20,000	23.8	76.2	4,760	15,240	
Sedimentation Tanks .....	80,000	85.0	15.0	68,000	12,000	
Sludge Tanks .....	50,000	85.0	15.0	42,500	7,500	
Sludge Disposal Plant .....	120,000	85.0	15.0	102,000	18,000	
Main Building .....	30,000	76.0	24.0	22,800	7,200	
Chlorinating Plant .....	70,000	85.0	15.0	59,500	10,500	
Outfall .....	5,000	73.8	26.2	3,700	1,300	
Roads and Grounds .....	15,000	57.0	43.0	8,550	6,450	
Administration .....	\$ 780,000	60.2	39.8	\$469,910	\$310,090	
	70,000	60.2	39.8	42,100	27,900	
Total Operating Cost .....	\$ 850,000	60.2	39.8	512,010	337,990	
Fixed Charges .....	962,500	31.8	68.2	307,000	655,500	
Total Annual Cost .....	\$1,812,500	45.2	54.8	\$819,010	\$993,490	

TABLE VII

**Illustrative Computation of the Allocation of the Use Share of the Construction Cost or Fair Value to Quantity, Suspended Solids and Chlorine Demand**

(1) Major Part or Function	(2) Total Fair Value of the Use Share	(3) Chargeable to Quantity		(5) Chargeable to Suspended Solids		(7) Chargeable to Chlorine Demand	
		Per Cent	Amount	Per Cent	Amount	Per Cent	Amount
Collecting Sewers, Combined .....	\$ 790,000	100.0	\$ 790,000		\$		\$
Intercepting Sewers							
Main Line .....	1,320,000	99.0	1,306,800	1.0	13,200		
North Branch .....	836,000	99.0	827,640	1.0	8,360		
River Crossing .....	105,000	99.0	103,950	1.0	1,050		
Pumping Stations							
North Branch Structure .....	53,000	99.0	52,470	1.0	530		
Equipment .....	24,000	99.0	23,760	1.0	240		
District #1							
Structure .....	9,500	99.0	9,405	1.0	95		
Equipment .....	3,150	99.0	3,120	1.0	30		
Main Station							
Structure .....	166,000	99.0	164,340	1.0	1,660		
Equipment .....	94,500	99.0	93,555	1.0	945		
Treatment Plant							
Screen and Grit Tanks .....	63,000			100.0	63,000		
Sedimentation Tanks .....	455,000	84.0	382,000	16.0	73,000		
Sludge Tanks .....	340,000			100.0	340,000		
Sludge Disposal Plant .....	535,000			100.0	535,000		
Main Building .....	494,000	40.0	197,500	40.0	197,500	20.0	99,000
Chlorinating Plant .....	76,000					100.0	76,000
Outfall .....	100,000	100.0	100,000				
Roads and Grounds .....	114,000	40.0	45,600	40.0	45,600	20.0	22,800
Annual Amount at 5.5% .....	\$5,578,150	73.5	\$4,100,140	23.0	\$1,280,210	3.5	\$197,800
	\$ 307,000		\$ 225,600		\$ 70,600		\$ 10,800

**TABLE VIII**  
**Illustrative Computation of the Allocation of the Use Share of the Total Annual Cost to Quantity, Suspended Solids, and Chlorine Demand**

(1) Major Part or Function	(2) Annual Amount of Operation Caused by Use	(3) Chargeable to Quantity		(4) Chargeable to Quantity		(5) Chargeable to Suspended Solids		(6) Chargeable to Suspended Solids		(7) Chargeable to Chlorine Demand		(8) Amount
		Per Cent	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent	Amount	Per Cent	Amount	
Collecting Sewers, Combined	\$104,000	50.0	\$ 52,000	50.0	\$ 52,000	50.0	\$ 52,000	0.	\$	0.	\$	
Intercepting Sewers												
Main Line	8,000	95.0	7,600	5.0	400	5.0	400	0.		0.		
North Branch	4,400	95.0	4,180	5.0	220	5.0	220	0.		0.		
River Crossing	2,100	95.0	2,000	5.0	100	5.0	100	0.		0.		
Pumping Stations												
North Branch	12,000	98.0	11,760	2.0	240	2.0	240	0.		0.		
District No. 1	6,600	98.0	6,470	2.0	130	2.0	130	0.		0.		
Main Station	21,000	98.0	20,580	2.0	420	2.0	420	0.		0.		
Treatment Plant												
Screens and Grit Tanks	4,760			100.0	4,760	100.0	4,760	0.		0.		
Sedimentation Tanks	68,000			100.0	68,000	100.0	68,000	0.		0.		
Sludge Tanks	42,500			100.0	42,500	100.0	42,500	0.		0.		
Sludge Disposal Plant	102,000			100.0	102,000	100.0	102,000	0.		0.		
Main Building	22,800	30.0	6,840	30.0	6,840	30.0	6,840	40.0	9,120	40.0	9,120	
Chlorinating Plant	59,500								59,500	100.0	59,500	
Outfall	3,700	100.0	3,700	0.		0.		0.		0.		
Roads and Grounds	8,550	34.0	2,910	33.0		33.0	2,820	33.0		33.0	2,820	
Total Use Shares	\$469,910	25.2	\$118,040	59.6	\$118,040	59.6	\$280,430	15.2	\$71,440	15.2	\$71,440	
Administration	42,100		10,600		10,600		25,100		6,400		6,400	
Total Annual Cost of Operation	\$512,010		\$128,640		\$128,640		\$305,530		\$77,840		\$77,840	
Fixed Charges	307,000	13.5	225,600	23.0	225,600	23.0	70,600	3.5	10,800	3.5	10,800	
Total Annual Cost	\$819,010	43.3	\$354,240	45.9	\$354,240	45.9	\$376,130	10.8	\$88,640	10.8	\$88,640	

## CHAPTER 9

# Methods of Enforcing Payment of Water and Sewage Charges

### 1. INTRODUCTION

It is conceived to be desirable, for purposes of this chapter, to treat public and private water and sewage utilities together and simply note variations or differences where they appear. The first concern is to present the principal sanctions employed in collecting water and sewage charges—to treat of them in their legal context. That exposition will be followed by critical commentary and positive recommendations.

Water charges claim first consideration. The principal development of law and practice has taken place with respect to them and, to a substantial extent, has served as a guide for sewage charge enforcement. The close relationship of the two need not be labored here; it is common knowledge, for example, that water and sewage charges may be collected together. Special considerations affecting the enforcement of payment of sewage charges will be separately noted.

Exhaustive documentation will not be attempted. Reference to statutes, administrative regulations and judicial decisions will be made as appropriate.

### 2. WATER CHARGES

#### a. *Discounts*

We should deal briefly at the outset with a device which is an inducement and not a sanction. Discounts for prompt payment made available to customers on a uniform basis are widely employed to alleviate problems of collection. It would appear that authority for resort to the device by either a public agency or a private utility company would be sufficiently grounded in the general power to adopt reasonable rules for the conduct of the business, but express statutory provision covering the matter is not uncommon.<sup>1</sup>

One particular example in practice deserves special mention. In Monmouth, Illinois, an ordinance was passed providing for a large discount (33 1/3%) for prompt payment of the water and sewage charges together, within a specified time (on or before the 10th day of the month in which bills are rendered). The effect of this on a typical bill is to make the payment of the combined bill less than the payment of the larger of the two items independently. For example, a bill showing a charge of \$5.70 for water and \$2.70 for

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<sup>1</sup> See, for example, PURDON'S PA. STATS. 53 § 10051 (as to water charges of second class cities).

sewage service if paid together in due time would be subject to a discount of \$2.80 making the total bill \$5.60, which is less than the charge for water if paid alone.

A provision of this kind is designed to eliminate objections and guard against delinquencies in the sewage account. It presents some problems, however, particularly in view of the amount of the so-called discount. The line between a discount for the prompt patron and a penalty upon a dilatory one is not too sharp at best. In this instance if the concession to one who gets a "discount" is not excessive from a business standpoint the fifty per cent additional paid by the late patron would appear so and thus might be realistically labeled a "penalty" as to such part as was excessive.

On the merits, it is suggested that discounts for prompt payment should be related in amount to the costs they are designed to obviate—interest, accounting and follow-up attempts to collect overdue bills.

#### *b. Interest and Penalties*

The leverage of the discount device is increased if interest or penalties, or both, may be exacted on overdue water or sewage charges. In the absence of statutory provision or administrative regulation to the contrary, it seems safe to say that either a utility company or a public unit may reasonably require the payment of interest on delinquent accounts in line with the concept of interest on overdue claims as damages for loss of the use of the money owed. A penalty, however, is another matter, and there is authority that, in the absence of statutory provision for the imposition, a penalty, even if exacted by a public agency, is unreasonable and void.<sup>2</sup> It is doubtless desirable that a statutory grant of authority be broad enough to permit the imposition of graduated penalties on long overdue accounts, so that the burden may be proportioned to the delinquency of the patron.

It is obvious that interest and penalties present a public relations problem and one would hardly expect them to be generally favored as a matter of business policy.

#### *c. Deposits*

It is a commonplace that in the operation of either a public or private water or sewage facility a reasonable deposit may be required to assure prompt payment of charges as a condition precedent to providing service.<sup>3</sup> It has even been held that service may be cut

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<sup>2</sup> *Carmichael v. City of Greenville*, 112 Miss. 426, 73 So. 278 (1916). Section 66.069 Wisc. STAT., is an example of a statutory provision for a penalty for non-payment of water bills due a municipality operating a water system.

<sup>3</sup> *Young v. City of Moultrie*, 163 Ga. 829, 137 S.E. 257 (1926); *McCormacks, Inc. v. City of Tacoma*, 170 Wash. 103, 15 P. 2d 688 (1932).

off for failure to make a deposit, authorized by public service commission regulation, in the case of a patron who had paid in advance for service for some months ahead.<sup>4</sup>

In a state in which the public service commission has jurisdiction over the subject one may encounter commission regulations limiting the amounts which may be exacted as deposits, requiring payment of interest on deposits, confining the exaction of deposits to cases where credit has not been established, or otherwise circumscribing the use of the device.

Specific statutory regulation of the exaction of deposits is illustrated by an Ohio law.<sup>5</sup> The act forbids a water company to require a deposit from a financially responsible freeholder or a person able to give a reasonably safe guaranty covering sixty days' supply. In other cases a maximum deposit of an amount equal to the charges for the monthly average of the patron's annual consumption plus thirty per cent may be required. Minimum interest of three per cent per annum must be paid on deposits held for at least six consecutive months.<sup>6</sup>

#### d. *Payment in Advance*

This recourse is closely related to the deposit device. It is mechanically a very simple matter where service is furnished on a flat-rate basis. Under a metered-service arrangement it is necessary to resort to an estimate of what the bill will be. Rules requiring pre-payment must be reasonable. To insist, for example, that the customer pay for a full year in advance might be needlessly onerous for him and amount to "overprotection" of the utility.<sup>7</sup>

#### e. *Personal Liability of Owner of Premises*

Tenants come and go and may be less responsible financially than the owner of the premises. Thus, there are practical reasons for wanting to look to the owner for payment. Where the owner does not have facilities by which service to each of a number of tenants can be separately measured and controlled it may be considered entirely reasonable to insist that he be responsible.<sup>8</sup> That result was reached in a New Jersey case involving a duplex occupied by two independent tenants and not equipped for separate control of the supply of each tenant.<sup>9</sup> A like conclusion was reached in a Louisiana case in which there was the additional factor of a

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<sup>4</sup> *Maricopa Utilities Co. v. Cline*, 60 Ariz. 209, 134 P. 2d 156 (1943).

<sup>5</sup> OHIO GEN. CODE § 9334.

<sup>6</sup> For another example of a requirement that interest be paid on deposits, see *TEX. REV. CIV. STAT.* § 1440 (Vernon 1945).

<sup>7</sup> See *Rockland Water Co. v. Adams*, 84 Me. 472, 24 Atl. 840 (1892).

<sup>8</sup> *Cox v. Cynthiana*, 123 Ky. 363, 96 S.W. 456 (1906).

<sup>9</sup> *Millville Improvement Co. v. Millville Water Co.*, 92 N.J. Eq. 480, 113 Atl. 516 (N.J. Chan. 1921).



statutory lien for water charges.<sup>10</sup> It was positively declared in the New Jersey case, however, that such a regulation would be unreasonable as applied to premises where service to tenants could be individually controlled. It has been so decided elsewhere in the case of a tenant obtaining unmetered service for which he was prepared to pay in advance.<sup>11</sup>

In a large apartment building or group of buildings it may be distinctly advantageous to the owner and tenants (but hardly to the utility) to have single-point service to the owner who takes utility services into account in fixing rent. If he can obtain classification as a commercial consumer he will enjoy the low commercial rate.<sup>12</sup>

The subject is governed by statute in some states. There is little doubt that the burden of water charges may constitutionally be imposed upon the owner.<sup>13</sup>

It is a rather common procedure to commit the owner by contract to pay for water service to particular premises. That arrangement may be available as an alternative to a contract directly with the tenant receiving the water service. A Utah statute authorized a city to require, as a condition to furnishing water to a tenant, that the owner enter into an agreement with the city by which he undertook to pay for water service to the tenant. It was given effect by the state supreme court.<sup>14</sup> It was declared, *obiter*, that the statute would ground a denial of service to a tenant, unless the owner would pay, only where an agreement with the owner had been exacted. Nor is such a statute authority for requiring a new owner to pay arrearages of a former owner and his tenant in order to get service.<sup>15</sup> It would appear, moreover, that while a genuinely voluntary agreement with an owner to pay for service to a tenant would bind the owner, there must be a statutory basis for a utility rule which would condition service to a tenant upon the making of a contract by the owner to pay. In a West Virginia case it was decided that a statute authorizing the exaction of service charges for sewage service from the "users" of the service did not empower a city to impose the charges upon property owners regardless of the actual occupancy

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<sup>10</sup>Land Development Co of Louisiana v. Sewerage and Water Board, 175 La. 669, 144 So. 241 (1932).

<sup>11</sup>Farmer v. Mayor and City Council of Nashville, 127 Tenn. 509, 156 S.W. 188 (1913). *But see* Kelsey v. Fire and Water Commissioners, 113 Mich. 215, 71 N.W. 589 (1897).

<sup>12</sup>Philadelphia Suburban Water Co. v. Pennsylvania Public Utility Commission, 164 Pa. Super. 320, 64 A. 2d 500 (1949).

<sup>13</sup>Prudential Co. of Minnesota v. City of Minneapolis, 207 Minn. 70, 277 N.W. 351 (1938).

<sup>14</sup>H.O.L.C. v. Logan City, 97 Utah 235, 92 P. 2d 346 (1939).

<sup>15</sup>*Ibid.*

of their premises.<sup>16</sup>

In a state in which municipalities enjoy a constitutional grant of home-rule powers the authority may exist, without benefit of enabling legislation, to impose the responsibility for payment of water supplied tenants upon the owners of premises. Certainly, this is the case in Ohio.<sup>17</sup>

*f. Denial of Service*

As we have already seen there may be adequate basis, associated with collection of charges, for denial of service in the first instance, such as refusal to make a deposit. May service be refused as a method of enforcing payment of charges for past service furnished the customer or someone else for the same premises or the customer for other premises?

(1) Past Service to Same Premises

If the service was furnished the person now seeking further service the denial of the latter would doubtless be sustained unless the utility had in effect waived that recourse as by accepting the customer's note or due bill for the old account and rendering further service in the interim.<sup>18</sup>

Past service to an independent user, such as a prior owner, or one's landlord or another tenant, is a very different matter. We turn to a New Jersey court for an exposition of applicable general principles:

"The general rule which appears to be recognized by practically all the authorities on the general subject may be said to be that, in the absence of legislation to the contrary, a tenant is privileged to contract for water service to the same extent as the owner of the property, and that any restriction upon or discrimination against that right of a tenant is inconsistent with the public duties imposed upon a water company and accordingly unlawful; and that, in the absence of legislation creating a lien on the real estate for water service or other legislation of like effect, no person can be denied service because of delinquency of a prior owner or tenant. No legislation in this state of the nature suggested has been brought to the attention of the court."<sup>19</sup>

The proposition just quoted has been applied, for example, in the case of: (a) a mortgagee in possession under a defaulted mortgage where the mortgagor was in arrears for water;<sup>20</sup> (b) a purchaser

<sup>16</sup> *McCoy v. City of Sistersville*, 120 W. Va: 471, 199 S.E. 260 (1938).

<sup>17</sup> *Pfau v. City of Cincinnati*, 142 Ohio St. 101, 50 N.E. 2d 172 (1943).

<sup>18</sup> *Wood v. City of Auburn*, 87 Me. 287, 32 Atl. 906 (1896); *Crumley v. Watauga Water Co.*, 99 Tenn. 420, 41 S.W. 1058 (1897).

<sup>19</sup> *Millville Improvement Co. v. Millville Water Co.*, 92 N. J. Eq. 480, 113 Atl. 516, 518 (N.J. Chan. 1921)

<sup>20</sup> *Vanderbilt v. Hackensack Water Co.*, 110 N. J. Eq. 636, 160 Atl. 825 (1932).

at a tax sale of property as to which the delinquent taxpayer was in default on water charges;<sup>21</sup> (c) a lessee seeking service to premises as to which the owner was in arrears on water charges;<sup>22</sup> (d) an owner in possession who requested service after the lien for water furnished a tenant became barred by limitations;<sup>23</sup> and (e) a purchaser seeking service to premises as to which a former owner was in arrears on water charges.<sup>24</sup>

Where there was more than one tenant and service to the individual tenants could not be separately controlled, it has been decided that one tenant could not compel service while another was in arrears on his share of the charges.<sup>25</sup>

The existence of a statutory lien for water or sewage charges makes a great deal of difference for present purposes. It provides a legal peg upon which to hang the contention that the very premises are subject to the claim and their effective enjoyment may hinge upon satisfaction of the claim. The courts usually uphold denial of service to a new owner or tenant to enforce payment of charges due from a prior occupant if the utility has a lien upon the premises for the amount of those charges.

## (2) Past Service to Same Customer on Other Premises

Denial of service to a patron who is in arrears for service received at other premises has been upheld in Tennessee but rejected in Idaho.<sup>27</sup> Since other means of assuring payment for future service are usually available and in view both of the monopoly character of the enterprise and of the unavoidable necessity of water and sewage service, the Idaho decision has much to commend it.

## *g. Shutting Off Service*

### (1) Cases Upholding Shut-Off

This drastic sanction is generally available. The cases upholding resort to it are legion. The list set out below, although extensive, is not claimed to be exhaustive.<sup>28</sup>

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<sup>21</sup> *Beaver Valley Water Co. v. Public Service Commission*, 70 Pa. Super. 621 (1918).

<sup>22</sup> *Alabama Water Co. v. Knowles*, 220 Ala. 61, 124 So. 96 (1929).

<sup>23</sup> *B. & B. Amusement Enterprises, Inc. v. City of Boston*, 297 Mass. 307, 8 N.E. 2d 788 (1937).

<sup>24</sup> *Farrell v. Ward*, 53 A. 2d 47 (D.C. Mun. Ct. of App. 1947).

<sup>25</sup> *Birmingham Waterworks Co. v. Brooks*, 16 Ala. App. 209, 76 So. 515 (1917), *cert. denied*, 200 Ala. 697, 76 So. 997 (1917).

<sup>26</sup> *H.O.L.C. v. Public Waterworks Dist. No. 2*, 104 Colo. 466, 92 P. 2d 745 (1939); *City of Atlanta v. Burton*, 90 Ga. 486, 16 S.E. 214 (1892); *Munson Dye Works v. Mayor and Aldermen of Jersey City*, 116 N. J. Eq. 568, 174 Atl. 740 (1938); *McCormacks, Inc. v. City of Tacoma*, 170 Wash. 103, 15 P. 2d 688 (1932) (statutory lien enforceable only by shutting off service).

<sup>27</sup> *Jones v. Mayor and City Council of Nashville*, 109 Tenn. 550, 72 S.W. 985 (1903). *Contra: Hatch v. Consumers' Co.*, 17 Idaho 204, 104 Pac. 670 (1909).

<sup>28</sup> *Alabama—Hieronymus Bros. v. Bienville Water Supply Co.*, 131 Ala. 447, 31 So. 31 (1901); on second appeal in 138 Ala. 577, 36 So. 453 (1904), and

## (2) Limitations Upon Authority to Shut Off

It is to be noted that there are important limitations upon the

on third appeal in 149 Ala. 265, 43 So. 124 (1907); *Birmingham Waterworks Co. v. Davis*, 16 Ala. App. 333, 77 So. 927 (1918); *Sims v. Alabama Water Co.*, 205 Ala. 378, 87 So. 688, 28 A.L.R. 461 (1921); *Birmingham Waterworks v. Keiley*, 2 Ala. App. 629, 56 So. 838 (1911); *MacMahon v. Baumhauer*, 234 Ala. 482, 175 So. 299 (1937); *Benson v. City of Andalusia*, 240 Ala. 99, 195 So. 443 (1940).

*California*—*Sheward v. Citizens' Water Co.*, 80 Cal. 635, 27 Pac. 439 (1891); *Schultz v. Town of Lakeport*, 5 Cal. 2d 377, 54 P. 2d 1110 (1936); *Schultz v. Town of Lakeport*, 5 Cal. 2d 377, 55 P. 2d 485 (1936).

*Colorado*—*Home Owners' Loan Corporation v. Public Waterworks Dist. No. 2*, 104 Colo. 466, 92 P. 2d 745 (1939).

*Florida*—*Miami Water Co. v. City of Miami*, 101 Fla. 506, 134 So. 592 (1931).

*Georgia*—*City of Atlanta v. Burton*, 90 Ga. 486, 16 S.E. 214 (1892); *Royal v. Cordele*, 132 Ga. 125, 63 S.E. 826 (1909); *Dodd v. City of Atlanta*, 154 Ga. 33, 113 S.E. 166, 28 A.L.R. 465 (1922); *Macon Gas, Light & Water Co. v. Freeman*, 4 Ga. App. 463, 61 S.E. 884 (1908); *Collier v. City of Atlanta*, 178 Ga. 575, 173 S.E. 853 (1934).

*Idaho*—*Hatch v. Consumers' Co.*, 17 Idaho 204, 104 Pac. 670 (1909), *aff'd*, 224 U.S. 148 (1912).

*Illinois*—*Barrell v. Lake Forest Water Co.*, 191 Ill. App. 269 (1915); *Barry v. Commonwealth Edison Co.*, 374 Ill. 473, 29 N.E. 2d 1014, *reversing* 302 Ill. App. 558, 24 N.E. 2d 220 (1940).

*Iowa*—*Spaulding Mfg. Co. v. Grinnell*, 155 Iowa 500, 136 N.W. 649 (1912); *Sloan v. Cedar Rapids*, 161 Iowa 307, 142 N.W. 970 (1913).

*Kansas*—*Shiras v. Ewing*, 48 Kan. 170, 29 Pac. 320 (1892); *Cooper v. Goodland*, 80 Kan. 121, 102 Pac. 244, 23 L.R.A. (N.S.) 410 (1909); *Holly v. Neodesha*, 88 Kan. 102, 127 Pac. 616 (1912).

*Kentucky*—*Cox v. Cynthiana*, 123 Ky. 363, 96 S.W. 456 (1906); *Covington v. Ratterman*, 128 Ky. 336, 108 S.W. 297 (1908); *Louisville Tobacco Warehouse Co. v. Louisville Water Co.*, 162 Ky. 478, 172 S.W. 928 (1915); *Schoening v. Paducah Water Co.*, 230 Ky. 453, 19 S.W. 2d 1073 (1929); *Lackett v. Prestonsburg Water Co.*, 238 Ky. 613, 38 S.W. 2d 687 (1931).

*Louisiana*—*Land Development Co. of La. v. Sewerage and Water Board*, 175 La. 669, 144 So. 241 (1932); *Coult v. Mayor and Board of Aldermen, City of Gretna*, 11 So. 2d 424 (La. App. 1943).

*Maine*—*Wood v. Auburn*, 87 Me. 287, 32 Atl. 906 (1895); *Robbins v. Bangor R. & Electric Co.*, 100 Me. 496, 62 Atl. 136 (1905).

*Maryland*—*Carter v. Suburban Water Co.*, 131 Md. 91, 101 Atl. 771 (1917).

*Massachusetts*—*Scott v. Dednam Water Co.*, 224 Mass. 398, 113 N.E. 282 (1916); *Loring v. Commissioner of Public Works of City of Boston*, 264 Mass. 460, 163 N.E. 82 (1928).

*Michigan*—*Kelsey v. Fire & Water Comrs.*, 113 Mich. 215, 71 N.W. 589 (1897).

*Minnesota*—*McGregor v. Case*, 80 Minn. 214, 83 N.W. 140 (1900); *Prudential Co. of Minnesota v. City of Minneapolis*, 202 Minn. 70, 277 N.W. 351 (1938).

*Mississippi*—*Burke v. City of Water Valley*, 87 Miss. 732, 40 So. 820 (1906); *Carmichael v. City of Greenville*, 112 Miss. 426, 73 So. 278 (1916).

*Missouri*—*McDaniel v. Springfield Waterworks Co.*, 48 Mo. App. 273 (1892); *Mulrooney v. Obeare*, 171 Mo. 613, 71 S.W. 1019 (1903).

*Montana*—*State ex rel. Milsted v. Butte City Water Co.*, 18 Mont. 199, 44 Pac. 966 (1896).

authority to shut off service as a means of collecting charges.

*Nebraska*—American Waterworks Co. v. State, 46 Neb. 194, 64 N.W. 711 (1895).

*New Jersey*—Howe v. City of Orange, 70 N. J. Eq. 648, 62 Atl. 777, *aff'd*, 73 N. J. Eq. 410, 75 Atl. 1101 (1906); Ford Motor Co. v. Town of Kearney, 91 N. J. Law 671, 103 Atl. 254 (1918).

*New Mexico*—Water Supply Co v. City of Albuquerque, 9 N. M. 441, 54 Pac. 969 (1898); State *ex rel.* Scottillo v. Water Supply Co., 19 N. M. 27, 140 Pac. 1056 (1914); Sei v. Water Supply Co., 19 N. M. 70, 140 Pac. 1067 (1914).

*New York*—Treadwell v. Van Schiack, 30 Barb. 444 (1859); Brass v. Rathbone, 153 N. Y. 435, 47 N.E. 905 (1897); *affirming*, 8 App. Div. 78, 40 N. Y. Supp. 466 (1896); McEntee v. Kingston Water Co., 165 N. Y. 27, 58 N.E. 785 (1900); People *ex rel.* O'Brien v. Keating, 55 App. Div. 555, 67 N. Y. Supp. 413 (1900), *aff'd without opinion*, 166 N. Y. 601, 59 N.E. 1128 (1901); Krumenaker v. Dougherty, 74 App. Div. 452, 77 N. Y. Supp. 467 (1902); J. N. Matthews Co. v. City of Buffalo, 126 N. Y. Supp. 596 (1910); Greenberger v. Queens County Water Co., 159 App. Div. 401, 144 N. Y. Supp. 535 (1913); Frothingham v. Bensen, 20 Misc. 132, 44 N. Y. Supp. 879 (1897); Board of Education v. Richmond, 137 N. Y. Supp. 62 (1912); Parsons Constr. Corp. v. City of New York, 163 Misc. 932, 298 N. Y. Supp. 276 (1937).

*Ohio*—City of Mansfield v. Humphreys Mfg. Co., 82 Ohio St. 216, 92 N.E. 233 (1910); Gatton v. City of Mansfield, 67 Ohio App. 210, 36 N.E. 2d 306 (1940); Wayne Furniture Co. v. City of Dayton, 57 N.E. 2d 667 (1944); *appeal dismissed* 143 Ohio St. 517, 55 N.E. 2d 808 (1944).

*Pennsylvania*—Girard Life Insurance Co. v. City of Philadelphia, 88 Pa. 393 (1879), *affirming*, 12 Phila. 293, 35 Phila. Leg. Int. 16 (1878); Appeal of City of Harrisburg, 107 Pa. 102 (1884); Appeal of Brumm, 9 Sadler 483, 22 W.N.C. 137, 12 Atl. 855 (1888); Altoona v. Shellenberger, 6 Pa. Dist. R. 544 (1896); Smith v. Scranton Gas & Water Co., 5 Lack. Leg. News 235 (1899); The Penn Iron Co. v. The City of Lancaster, 17 Lancaster L. Rev. 161, *aff'd*, 15 Pa. Super 556 (1900); Tyrone Gas & Water Co. v. Burley, 19 Pa. Super. 348 (1902); Kohler v. Roitz, 46 Pa. Super. 350 (1911); Pennsylvania Water Co. v. Robinson, 39 Pa. Co. Ct. 260 (1911); Sinking Spring Water Co. v. Wyomissing Borough, 22 Pa. Dist. R. 716 (1911); American Conduit Mfg. Co. v. Kensington Water Co. 234 Pa. 208, 83 Atl. 70 (1912); Rochester Bldg. & Loan Assn. v. Beaver Valley Water Co., 68 Pa. Super. 122 (1917); Beaver Valley Water Co. v. Public Service Commission, 70 Pa. Super. 621 (1918); Kauffman v. Public Service Commission, 81 Pa. Super. 48 (1923).

*Rhode Island*—Walsh v. Briston & Warren Waterworks, 39 R. I. 292, 97 Atl. 798 (1916).

*South Carolina*—Poole v. Paris Mountain Water Co., 81 S. C. 438, 62 S. E. 874 (1908); Benson v. Paris Mountain Water Co., 88 S. C. 351, 70 S.E. 879 (1911); Arnold v. Carolina Power & Light Co., 168 S.C. 163, 167 S.E. 234 (1933).

*Tennessee*—Harbison v. Knoxville Water Co., 53 S.W. 993 (1899); Jones v. Mayor, etc., of Nashville, 109 Tenn. 550, 72 S.W. 985 (1903); Farmer v. Mayor, etc., of Nashville, 127 Tenn. 509, 156 S.W. 189 (1913).

*Texas*—City of Houston v. Lockwood Inv. Co., 144 S.W. 685 (1912); City of Wichita Falls v. Landers, 291 S.W. 696 (1927).

*Washington*—Tacoma Hotel Co. v. Tacoma Light & Water Co., 3 Wash. 316, 28 Pac. 516 (1891); Linne v. Bredes, 43 Wash. 540, 86 Pac. 858 (1906); State *ex rel.* Wehe v. Pasco Reclamation Co., 90 Wash. 606, 156 Pac. 834 (1916); Moran v. City of Seattle, 179 Wash. 555, 38 P. 2d 391 (1934); Home Owners' Loan Corp. v. City of Tacoma, 4 Wash. 2d 166, 102 P. 2d 832 (1940).

(a) Necessity that there be a Lien or Express Statutory Authority

The limitation applicable to denial of service in order to enforce payment of charges for service to former owners or occupants is applicable to the sanction of cutting off service. In neither situation is shut-off supportable unless the premises are subject to a lien for the charges or there is clear statutory authority for the action.<sup>29</sup>

(b) No Shut-Off to Enforce Discriminatory or Excessive Charges

Service may not lawfully be shut off to enforce payment of charges which are discriminatory or excessive.<sup>30</sup>

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<sup>29</sup> *District of Columbia*—Farrell v. Ward, 53 A. 2d 46 (Mun. C.A., D.C., 1947).

*Kentucky*—City of Covington v. Ratterman, 128 Ky. 336, 108 S.W. 297 (1908).

*Illinois*—City of Chicago v. Northwestern Mut. Life Ins. Co., 218 Ill. 40, 75 N.E. 803 (1905).

*Massachusetts*—Merrimack River Sav. Bank v. City of Lowell, 152 Mass. 556, 26 N.E. 97 (1891); Cambridgeport Sav. Bank v. City of Boston, 297 Mass. 309, 8 N.E. 2d 790 (1937).

*New Jersey*—McDowell v. Avon-by-the-Sea Land Improv. Co., 71 N. J. Eq. 109, 63 Atl. 13 (1906); Home Owners' Loan Corp. v. City of New Brunswick, 124 N. J. Eq. 305, 1 A. 2d 854 (1938).

*New York*—Title Guarantee & Trust Co. v. 457 Schenectady Avenue, 260 N.Y. 119, 183 N.E. 198 (1932), reargument denied, 261 N.Y. 536, 185 N.E. 728 (1933); New York Water Service Corp. v. Title Guarantee & Trust Co., 289 U.S. 741 (1933).

*South Carolina*—Poole v. Paris Mountain Water Co., 81 S. C. 438, 62 S.E. 874 (1908).

*Texas*—City of Houston v. Lockwood Inv. Co., 144 S.W. 685 (1912).

*Vermont*—Waldron v. International Water Co., 95 Vt. 135, 112 Atl. 219 (1921).

<sup>30</sup> *Alabama*—Smith v. Birmingham Waterworks Co., 104 Ala. 315, 16 So. 123 (1893); City Cleaning Co. v. Birmingham Waterworks Co., 204 Ala. 51, 85 So. 291 (1920); Hodge v. Alabama Water Co., 205 Ala. 472, 88 So. 585 (1921). And see Birmingham Waterworks Co. v. Brooks, 16 Ala. App. 209, 76 So. 515 (1916), cert. denied, 200 Ala. 697, 76 So. 995 (1917).

*Illinois*—Kerz v. Galena Motor Co., 139 Ill. App. 598 (1908); Barrell v. Lake Forest Water Co., 191 Ill. App. 269 (1915).

*Maine*—Robbins v. Bangor R. & Electric Co., 100 Me. 496, 62 Atl. 136 (1905).

*Minnesota*—Gordon & Ferguson v. Doran, 100 Minn. 343, 111 N.W. 272 (1907). Cf. McGregor v. Case, 80 Minn. 214, 83 N.W. 140 (1900).

*Mississippi*—Woods v. Indianola, 114 Miss. 722, 75 So. 549 (1917).

*Missouri*—McDaniel v. Springfield Waterworks Co., 48 Mo. App. 273 (1892).

*Montana*—Horsky v. Helena Consol. Water Co., 13 Mont. 229, 33 Pac. 689 (1893).

*Nebraska*—Hoover v. Dittenbaugh, 83 Neb. 476, 119 N.W. 1130 (1909).

*New Jersey*—Washington v. Washington Water Co., 70 N. J. Eq. 254, 62 Atl. 390 (1905).

*New York*—Pond v. New Rochelle Water Co., 183 N. Y. 330, 76 N.E. 211 (1906); Whitmore v. New York Interurban Water Co., 158 App. Div. 178, 142 N. Y. Supp. 1098 (1913).

In New York it may be shown as a complete defense to an action to enforce water charges that they were in excess of that fixed by the Public Service Commission or by statute in the municipality in which the action arose.<sup>31</sup>

(c) No Shut-Off where Charges in Dispute

Service may not lawfully be cut off to coerce payment of charges where there is a bona fide dispute as to either the customer's liability or the amount due.

The best recourse of a patron who learns of threatened shut-off in time is a proceeding for a temporary injunction to prevent interruption of service until the dispute can be settled.<sup>32</sup> In some of the cited cases the consumer was required to give bond to assure payment of any amount determined to be due.<sup>33</sup>

For wrongful shut-off a utility is liable in damages. The question arises whether, under the doctrine that a party must take reasonable steps to mitigate his damages, the patron should pay a disputed bill under protest and then sue to recover the amount paid or such part as was deemed excessive. It has been decided that where serious damage or loss could have been prevented by paying a relatively small amount in dispute and the patron was able to pay he could later recover no more than that in an action for damages.<sup>34</sup> If a relatively large payment were involved the patron might be excused from making it to mitigate damages.<sup>35</sup>

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*Texas*—Clebune Water, Ice & Lighting Co. v. City of Cleburne, 13 Tex. Civ. App. 141, 35 S.W. 733 (1896); Ball v. Texarkana Water Corp., 127 S.W. 1068 (Tex. Civ. App. 1910).

*Washington*—Jenkins v. Columbia Land & Improv. Co., 13 Wash. 502, 43 Pac. 328 (1896); Johnson v. Pacific Power & Light Co., 90 Wash. 492, 156 Pac. 530 (1916).

<sup>31</sup> NEW YORK PUBLIC SERVICE LAW, § 89n.

<sup>32</sup> Sims v. Alabama Water Co., 205 Ala. 378, 87 So. 668 (1921); Schultz v. Town of Lakeport, 5 Cal. 2d 377, 54 P. 2d 1110 (1936); City of Atlanta v. McJenkins, 163 Ga. 131, 135 S.E. 498 (1926); Spaulding Mfg. Co. v. Grinnell, 155 Iowa 500, 126 N.W. 649 (1912); Coult v. Mayor and Aldermen, City of Gretna, 11 So. 2d 424 (La. App. 1943); Carter v. Suburban Water Co., 131 Md. 91, 101 Atl. 771 (1917); Hoover v. Dffenbaugh, 83 Neb. 476, 119 N.W. 1130 (1909); Borough of Washington v. Washington Water Co., 70 N. J. Eq. 254, 62 Atl. 390 (1905); McEntee v. Kingston Water Co., 165 N. Y. 27, 58 N.E. 785 (1900); Mansfield v. Humphreys Mfg. Co., 82 Ohio St. 216, 92 N.E. 233 (1910); Vinson v. City of Winters, 173 S.W. 2d 142 (Tex. Civ. App. 1944); Hall v. Village of Swanton, 113 Vt. 424, 35 A. 2d 381 (1944).

<sup>33</sup> See also Louisville Tobacco Warehouse Co. v. Louisville Water Co., 162 Ky. 478, 172 S.W. 928 (1915).

<sup>34</sup> Holly v. City of Neodesha, 88 Kan. 102, 129 Pac. 616 (1912) (claimed arrearages \$50; patron alleged shut-off damages of over \$7000).

<sup>35</sup> Schultz v. Town of Lakeport, 5 Cal. 2d 377, 54 P. 2d 1110; 5 Cal. 2d 377, 55 P. 2d 485 (1936) (payment of \$134 to save a garden alleged to be worth \$662.15 but found by court to involve much less).

Notice may well be taken at this point of the judicially-labored distinction between governmental or public functions of local units and their proprietary or private activities. We are told that a water works system is usually operated in a dual capacity: (i) to furnish water for fire protection and street cleaning, which is labeled governmental; and (ii) to provide water service for ordinary domestic, commercial and industrial use or consumption, which is said to be a proprietary activity.<sup>36</sup> Stress has been laid upon the profit element in the second function although it is clear enough that the prime object of a local unit in providing water service is not profit in the business sense but the rendering of a service essential to the community.

The application of the distinction is important because the prevailing view is that a municipality is immune from liability for the wrongful acts of its personnel done in the conduct of a governmental activity. Nor has the immunity been confined to the activity of a municipality in supplying water for fire protection under the full control of the local authorities. It has, significantly enough, been invoked where water was being supplied for use in a sprinkler system on private property.<sup>37</sup> It is possible in a given situation of that general character that liability for cutting off service might be predicated upon breach of an express contract for the service.

If wrongful shut-off is an accomplished fact the patron should be able to get specific relief. Damages are no adequate substitute for water or sewage service. A writ of mandamus is, generally speaking, the appropriate remedy to compel a public agency to restore service.<sup>38</sup> In some jurisdictions it is considered that the duty of a private utility to render service is of such public interest that mandamus is appropriate as against it.<sup>39</sup> Mandatory injunction is doubtless an appropriate remedy where mandamus is not available.

#### (d) Statutory or Administrative Regulation of Shut-Off

In a given jurisdiction there may be statutory or public service commission regulation of shut-offs, requiring, for example, that notice in writing be given for a minimum period before the action may be taken. A notice requirement is a salutary measure since it gives the customer a chance to protect himself against drastic action and is likely to produce favorable results for the utility, at least as to undisputed bills.

Section 89b, 3-a, of the New York Public Service Law is illustrative.

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<sup>36</sup> *Lober v. Kansas City*, 339 Mo. 1087, 74 S.W. 2d 815 (1934).

<sup>37</sup> *Nashville Trust Co. v. City of Nashville*, 182 Tenn. 545, 188 S.W. 2d 342 (1945).

<sup>38</sup> *H.O.L.C. v. Logan City*, 97 Utah 235, 92 P. 2d 346 (1939).

<sup>39</sup> See the cases cited in the *Logan City* case, *supra* note 38.



"No water-works corporation shall discontinue or disconnect the supply of water for non-payment of water rents, rates or charges, unless such water-works corporation shall have first given fifteen days' written notice of its intention so to do to the owner of the premises thereby affected, or in lieu thereof, to the person, firm or corporation to whom or which the last preceding bill has been rendered and from whom or which the water-works corporation has received payment therefor, and to the superintendent or other persons in charge of the building or premises thereby affected, if it can be readily ascertained that there is such superintendent or other person in charge. Such notice in every case shall be served either personally on the person, firm or corporation to which it is directed, or by mailing the same in a postpaid wrapper to the address of such person, firm or corporation. If the premises consist of a multiple dwelling or tenement house occupied or intended to be occupied by more than two families, living independently of each other, a like notice shall first be given to the occupants thereof by posting a copy of such notice in the public hallway or corridor on each floor of said premises. For the purpose of posting the notices provided for herein, the duly authorized employee or employees of a water-works corporation shall have the right to enter upon the premises affected at a reasonable time during the hours between nine o'clock ante meridian and four o'clock post meridian."

#### *h. Liens on Premises—Enforcement Like a Tax Lien*

Whether or not, apart from the unusual case of a patron conveying an interest in his premises to secure payment of water or sewage charges, the premises are subject to a lien for water or sewage charges depends entirely upon the provisions of positive law. Provision for a statutory lien is common as to utilities of local units of government but not as to those in private ownership and operation.

Provision for a lien does not, of itself, impose personal liability on the owner for service not rendered to him.<sup>40</sup> Nor does it affect the personalty of the patron.<sup>41</sup>

The nature and priority of the lien is a matter which again depends upon positive law.<sup>42</sup> The Washington statute makes the so-called lien for municipal meter charges enforceable only by shutting off the service; there is no foreclosure.<sup>43</sup>

In Illinois the statutory liens for water and sewage charges have only the quality and priority of a mortgage lien. They are

<sup>40</sup> *Provident Trust Co. v. Judicial Bldg. and Loan Ass'n.*, 112 Pa. Super. 352, 171 Atl. 287 (1934).

<sup>41</sup> *City of Cincinnati v. Schultz*, 97 Ohio St. 317, 120 N.E. 176 (1918).

<sup>42</sup> *H.O.L.C. v. Tyson*, 133 Ohio St. 184, 12 N.E. 2d 478 (1938).

<sup>43</sup> *McCormacks, Inc. v. City of Tacoma*, 170 Wash. 103, 15 P. 2d 688 (1932).

foreclosed in like manner as a mortgage. Thus, prior mortgages would outrank them.<sup>44</sup> The same has been declared to be so under a New Hampshire statute silent as to priorities.<sup>45</sup>

In a number of states delinquent water charges may be enforced by having them entered upon the tax duplicates or rolls and then collected in like manner as ad valorem taxes. So it is as to all municipalities in Wisconsin,<sup>46</sup> villages in Ohio<sup>47</sup> and third-class cities, for example, in Pennsylvania.<sup>48</sup>

It has been determined in New York that the lien does not attach until the amount of the charge is ascertained and fixed.<sup>49</sup>

In Connecticut both public and private water works have a lien for water furnished. It lasts but one year unless a certificate of continuation is filed as in case of a tax lien.<sup>50</sup>

#### i. Distress—*Personal Property on Premises*

This is, doubtless, an uncommon method of enforcement. One finds Pennsylvania authority for distress of personal property on the premises to enforce sewage charges.<sup>51</sup> It may fairly be described as an historical carry-over which has outlived its day. It is a harsh remedy not conducive to pleasant public relations.

#### j. Punitive Sanctions

This topic has been subjected to but very limited inquiry. It is considered safe to say, however, that it is not of major importance. A penal sanction may well be in order where services are obtained by fraud or are, in effect, stolen, but to employ it in a simple case of delinquency in payment raises questions of imprisonment for debt. It is to be noted that the Alabama court has sustained the imposition of a fine for using a sewage system without paying service charges in advance.<sup>52</sup>

### 3. SEWAGE CHARGES

#### a. *Special Considerations Affecting*

It is evident that most of the methods of enforcing water charges are adaptable to the collection of sewage charges. Shutting off sewage service would, however, be physically and administratively difficult if undertaken independently of water service. There are,

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<sup>44</sup> ILL. REV. STAT. c. 24, §§ 60-16 and 75-4.

<sup>45</sup> Whitfield Village Fire Dist. v. Bobst, 93 N.H. 229, 39 A. 2d 566 (1944).

<sup>46</sup> WISC. STAT. § 66.069 (1) (b) (1949).

<sup>47</sup> OHIO GEN. CODE § 4361.

<sup>48</sup> PURDON'S PA. STATS. § 12198-3588. See also R. I. GEN. LAWS c. 449, § 1 (1938).

<sup>49</sup> Mandel v. West, 128 App. Div. 505, 112 N. Y. Supp. 813 (1908), *aff'd*, 198 N. Y. 518, 92 N.E. 1091 (1910).

<sup>50</sup> GEN. STAT. CONN. § 7251 (1949).

<sup>51</sup> PURDON'S PA. STATS. 53-§ 14464 (as to boroughs).

<sup>52</sup> Benson v. City of Andalusia, 240 Ala. 99, 195 So. 443 (1940).

in addition, policy considerations which militate against shut-off. While the wisdom of the device is reserved for comment at a later juncture, it is not inappropriate to say here that public health and sanitation problems are presented by a collection method which interrupts water and sewage service. This factor has gained some statutory recognition. Thus, the Colorado statutes forbid resort to shut-off as a sewage charge collection method.<sup>53</sup> In New Jersey a private sewer company may disconnect after charges have been delinquent at least thirty days but only after notifying the local health officer. The latter notifies the owner and informs him that upon discontinuation the property must be vacated.<sup>54</sup>

*b. Shutting Off Water to Collect Sewage Charges*

There is a dictum in an Alabama case that to shut off water to collect a sewage charge would be tantamount to taking property without due process of law.<sup>55</sup> In a leading case decided by the Supreme Court of Florida in 1946 the Alabama view was flatly repudiated.<sup>56</sup> The court stressed the interdependence of the two services. The result is supported by a decision of an intermediate appellate court in Ohio.<sup>57</sup>

The situation in which the water utility is privately owned and operated and the sewage system is a facility of a public agency presents complications. Doubtless a voluntary arrangement, made by contract, for water shut-off to enforce payment of sewage charges would be constitutionally supportable.<sup>58</sup> The pertinent provisions of Connecticut Public Act No. 355 of 1949 are of this voluntary character. Section 14 authorizes a municipality operating a sewage system to enter into an agreement with a water company or municipal water department furnishing water in the municipality by which the latter is designated the billing or collecting agent of the collector of sewage system charges. The agent is authorized by the statute to employ for the collection of the sewage charges any method it may use to collect its water charges.

Pennsylvania Act Number 98 of 1949 goes much further; it has a compulsory feature. It requires a water utility to cut off service to a patron in arrears thirty days for sewage charges of any municipal authority organized by any county of the second class (Allegheny) at the request of that authority or a municipality or town-

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<sup>53</sup> COLO. STAT. ANN. c. 163, § 41 (4) (Cum. Supp. 1947).

<sup>54</sup> These regulations have been reported to the committee by a private sewerage company. Presumably they are laid down by administrative authority.

<sup>55</sup> McMahon v. Baumhauer, 234 Ala. 482, 175 So. 299, 303 (1937).

<sup>56</sup> State v. City of Miami, 157 Fla. 726, 27 So. 2d 118 (1946).

<sup>57</sup> Gatton v. City of Mansfield, 67 Ohio App. 210, 36 N.E. 2d 306 (1940).

<sup>58</sup> Rash v. Louisville and Jefferson County Metropolitan Sewer District, 309 Ky. 442, 217 S.W. 232 (1949).

ship to which the claim for sewage charges had been assigned.<sup>59</sup> The local unit requesting the shut-off must pay the water utility the cost of effecting it plus the estimated loss of water revenues resulting from the shut-off. Whether such enforced assistance by the privately-owned water utility will stand up in the courts remains to be seen.

*c. Making Water Patron Liable for Sewage Service*

A recent Oklahoma decision sustained this device. In that case the sewage charge was based on water consumption.<sup>60</sup> The court saw nothing inequitable in making the sewage charge to the person liable for the charge for water service since he must, of necessity, use the sewage system to dispose of the water. This, of course, may be true only in part as where water is used for lawn sprinkling.

#### 4. COMMENTS AND RECOMMENDATIONS

a. Discounts are a useful device. They express a positive philosophy of rewarding the prompt patron in contrast with the wrist-slapping implications of penalties. They should, however, be related in amount to the additional cost of interest, accounting and follow-up attempts to collect overdue bills. There is merit in the suggestion that the bill-paying practices of individuals be recognized by extending the discount period to the tenth of the month following the month in which a bill is rendered.

b. Interest on overdue accounts is clearly in order where the discount method is not employed. It appears appropriate, in any case, for an excessive period of delay in payment.

Penalties are considered generally undesirable but might reasonably be used as a means of recovering both interest and additional cost of billing and collecting on long overdue accounts. Statutory authority to make the penalty progressively heavier in proportion to the period of delinquency appears desirable.

c. The exacting of deposits should be confined to patrons of unknown or poor credit ratings. The patron is entitled to interest on his deposit and to a refund in the event service is discontinued and his bills have been paid in full.

d. The requiring of payment in advance is not recommended. That type of recourse is closely related to the deposit device and it is not evident that the latter is not sufficient to protect the utility where assurance is needed.

e. It is not unreasonable per se to impose personal liability on an owner for service rendered a tenant. To adopt such a policy is to pass to the owner the problem of working out satisfactory ar-

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<sup>59</sup> There is a similar special act applicable to the City of Tampa, Florida. LAWS OF FLA., SPECIAL ACTS 1947, c. 24934, § 2.

<sup>60</sup> Sharp v. Hall, 198 Okla. 678, 181 P. 2d 972 (1947).

rangements with his tenants on the subject. This method is most desirable with respect to apartment buildings and other multiple dwellings.

f. Generally speaking, denial of service because of the delinquency of some former owner or occupant as to the immediate premises or of the present applicant as to other premises is not too harsh a method. There is firm ground for contending, however, that this recourse should be deemed available only if authorized by positive law, as is the case with a lien for back charges. To deny service to A because B, a prior occupant, was in arrears, is to seize on the property as a point of control and amounts, in effect, to a loose type of charge on the property. A legislative body is in a position, in either case, to attach conditions designed to prevent abuse. A statutory lien on the premises, enforceable in like manner as a tax lien, is a valuable safeguard which a legislature may make available to privately owned utilities as well as those under public ownership. It is worth noting that some Pennsylvania municipalities rely entirely on the lien authorized by statute and merely let the lien remain on file until the owner finds it necessary to lift it in order to mortgage or sell.

The drastic sanction of cutting off service is admittedly a relatively effective device. Its very availability is a salutary influence from the standpoint of the utility. It is much in order that recourse to it be so regulated that the patron can protect himself by due diligence. Since health considerations dictate that occupied premises be connected with a sanitary sewage system, continued occupancy of premises after service has been cut off should not be permitted. This can be controlled through the local health authorities.

g. It is highly appropriate that water and sewage charges be collected together, where the facilities are in single ownership, and that this course be permitted as a matter of voluntary contract even where there is separate ownership.

## General Summary

It is hoped that this report adequately develops the fundamental principle set forth at the beginning of Chapter 1, and sufficiently illustrates its need and its application. The reader is reminded that:

- a. The report speaks only for the Joint Group as a whole and does not necessarily represent the views of any individual member of the Group; and
- b. The illustrations of the application of the fundamental principle are, at this stage, somewhat preliminary and tentative.

None of the listed organizations has taken any official action upon the report and the conclusions and recommendations set forth do not commit any of these organizations in any way.

The fundamental principle regarding rates and rate structures is stated by the Joint Group as follows:

The needed total annual revenue of a water or sewage works shall be contributed by users and nonusers (or by users and properties) for whose use, need, and benefit the facilities of the works are provided approximately in proportion to the cost of providing the use and the benefits of the works.

Many readers may question whether any difference should be made in the application of the fundamental principle to publicly and privately-owned works. It is considered that the fundamental principle is applicable to each kind of ownership. However, there are differences in present law and tradition which alter its application. Except as to charges for fire protection, very few water works can or do now receive any part of their total needed annual revenue from nonusers or properties. It seems likely that ways will be provided for the fair application of the fundamental principles to privately-owned water works with due consideration to the proper interests of all of the owners and of the management.

Furthermore, the Joint Group find many departures in the present-day financing of the capital and current costs of publicly-owned works from what they consider to be fair. On the other hand, more or less fair results have been accomplished in a number of cases where, for instance, part or all of the fixed charges including debt service, have been contributed by property through taxes to meet the annual interest and retirement costs of general obligation bonds or otherwise, and where operation and maintenance costs and sometimes part of the fixed charges are contributed by users.

The generally prevailing present methods of financing publicly-owned works include, among others, the following:

- a. General Obligation bonds
- b. Special assessments which may be "funded" into bonds
- c. Revenue bonds
- d. Fire protection charges
- e. Charges for use in both water and sewage works

The present methods of financing available to privately-owned works are described in Chapter 5, with general statements describing the fundamental interests of management and of the individuals who furnish much of the money. The sources of the funds include the following:

- a. Equity capital in the forms of common and preferred stocks
- b. Borrowed funds, such as bonds and other evidences of indebtedness
- c. Earnings

Under these conditions and with good management, privately owned water and sewage works find themselves in a favorable position to accomplish the necessary financing.

It is considered by the Joint Group that the annual revenue requirements of each particular works will be determined and accepted based on experience applied to the local conditions prior to the application of the fundamental principle herein described for establishing rates and rate structures. Nevertheless, an understanding of the elements which make up the annual revenue is essential to a fair and correct understanding of the application of the fundamental principle and of present-day departures therefrom. It is considered that (for privately-owned works) the annual revenue requirements are the sum of the following:

- a. Operating expenses
- b. Depreciation
- c. Taxes
- d. Return on a rate base

For publicly-owned works, a fair adjustment of these elements should be made. These matters are discussed in Chapter 6.

There are many present practices in raising the total annual revenue as described in Chapter 7, including the following:

- a. Rates for the sale of water as a commodity including flat rates and various forms of rate schedules for metered water;
- b. So-called sewer rentals or rates, including the number and size of sewer connections, the type of property, the number and type of plumbing fixtures and a rate based

- c. on the quantity of water and the characteristics of the sewage;
- c. Charges for fire protection;
- d. Frontage assessments.

In some few present cases, some measure of joint contribution by users and non-users has been accomplished. Among these, it is recommended that the reader refer to the following:

- a. The Washington Suburban Sanitary District in Maryland
- b. The Buffalo Sewer Authority in New York
- c. The Brunswick Sewer District in Maine
- d. Fairfax County in Virginia
- e. The East Bay Municipal Utility District in California

The Joint Group find no common practice in either water or sewage works, that present rates have been fairly determined to comply with the fundamental principle.

Recommended procedures for computing fair rates and rate structures are discussed in Chapter 8. In general, the application of the fundamental principle to the determination of fair rates and rate structures for any particular situation, is considered to involve, first, the determination of the shares of the needed total annual revenue to be borne by users and by non-users, and second, an allocation of such shares among different classes of users and non-users. Methods to accomplish this are described with the comment that they are not intended to be rigid or final.

An illustrative computation for a sewage works resulted in the following allocation:

Contributors	Allocation of Total Annual Revenue in Per Cent
Users .....	45.2
Non-users .....	54.8

It is stated that the users' share should be allocated to different classes on the basis of the quantity and of the characteristics of the sewage. In the case illustrated, the allocation resulted in the following percentages:

Item	Share of Total Annual Revenue to be Contributed by Users in Per Cent
Sewage Quantity .....	43.3
Suspended Solids .....	45.9
Chlorine Demand .....	10.8

For other characteristics of the sewage, a similar computation would be required. The chapter gives a computation or application



of the resulting total annual amount to show the average unit rates for users and for non-users.

The principles involved in the foregoing would be generally applicable to a similar determination for a water works or combined water and sewage works.

As stated above, the Joint Group believe that it is important in the establishment of rates, to determine first the fair shares of the total annual revenue to be contributed respectively by users and by non-users. The arrangement of these shares into a rate structure follows, it seems, as a matter of secondary importance. Many competent studies and reports have been made on this problem. As regards many of the questions involved, there are honest differences of opinion.

A discussion of some of the present practices and views regarding water rates, related principally to the charges for fire protection and for water use, is given in Chapter 8. In determining the amount to be charged for fire protection, the proportional cost basis rather than the incremental cost basis is favored, and the demand ratio method of computation is suggested in lieu of the more cumbersome proportional plant methods. Also discussed is the manner in which the use portion of the charges may be distributed into the various brackets of a rate structure. Generally, the Joint Group approve a rate consisting of a ready-to-serve or a minimum charge, and three or more quantity blocks, with customer costs and part of capacity costs recovered by the ready-to-serve or the minimum charge; and production costs and the remaining capacity costs recovered through the quantity charges.

The Joint Group have expressed their preference as to methods and procedures applicable to some of these questions. While it is expected that the right answers are being or will be found, such differences in methods and practices do not, in the opinion of the Joint Group, disturb the general principle and the statements regarding its application, set forth in this report.

Chapter 9 of the report describes and offers comments upon methods of enforcing the payment of water and sewage charges. This is a highly important matter, especially to those charged with the management of the works, because of the necessity of having rates which can be enforced.

Existing enabling legislation varies widely. In most states further legislation would be necessary to enable water and sewage utilities to give full effect to the principle put forward by this report.

In general, the Joint Group recommend that enabling acts should be liberal rather than restrictive, so as to give the local authorities reasonable power to establish fair rates and rate structures in accordance with their local conditions and to provide

needed flexibility for combination financing. The following, from the Act establishing the Buffalo Sewer Authority, indicates the scope of powers with respect to rates and rate structures:

. . . the authority is authorized to establish a schedule of rates, rentals or charges, to be called 'sewer rents,' to be collected from all real property served by its facilities, and to prescribe the manner in which and the time at which such sewer rents are to be paid, and to change such schedule from time to time as may be deemed advisable. Such sewer rents may be based upon either the consumption of water on premises connected with such facilities, making due allowances for commercial use of water, the number and kind of plumbing fixtures connected with such facilities, or the number of persons served by such facilities, or *may be determined by the authority on any other equitable basis. . . .* (Italics supplied.)

It is considered that under some existing enabling acts the fundamental principle can be applied in part so as to approximate fair results.

The Joint Group, after many months of work, believe that they have accomplished the assignment of a study and report on fundamental considerations in rates and rate structures for water and sewage works. A final conclusion as to the soundness of the fundamental principle and of its application, must await the experience to be gained in its practical use in the many cases where financing or refinancing of water and sewage works is to be undertaken.